

# **Evaluation of NHS Direct first wave sites: Final report of the phase 1 research**

An independent research study carried out by the Medical Care Research Unit of the University of Sheffield, on behalf of the Department of Health. The views expressed are those of the authors and not necessarily those of the Department of Health.

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July 2001

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ISBN: 1 900750 25 2

Published by the Medical Care Research Unit (MCRU), University of Sheffield

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## 1. EXECUTIVE SUMMARY

NHS Direct, the national nurse-led telephone helpline, was established in March 1998 in three first wave areas covering approximately 1.3 million people. Since then the service has been extended in successive waves and by November 2000 was available to the whole of England and Wales. A similar service for Scotland, NHS 24, has also been announced.

The objectives of the service are:

- to offer the public a confidential, reliable and consistent source of professional advice on healthcare, 24 hours a day, so that they can manage many of their problems at home or know where to turn to for appropriate care;
- to provide simple and speedy access to a comprehensive and up to date range of health and related information;
- to help improve quality, increase cost-effectiveness and reduce unnecessary demands on other NHS services by providing a more appropriate response to the needs of the public; and
- to allow professionals to develop their role in enabling patients to be partners in self-care, and help them to focus on those patients for whom their skills are most needed.

The Medical Care Research Unit was originally commissioned to undertake an evaluation of the three NHS Direct first wave sites in December 1997. Two interim reports of this research have previously been published, in December 1998 and February 2000. This third report is the final report of this original phase of work, which has remained focused upon first wave sites and their original populations. A second phase of research has been commissioned by the Department of Health, and this will be reported in due course.

Our first interim report provided evidence on the organisation of first wave sites, the early demand for the service, caller experience of and satisfaction with NHS Direct, variation in call handling between sites, and impact on other services. The second report updated some of these early findings and also examined the casemix of the service and the limited evidence available on safety.

A number of key findings have emerged from the further research reported here:

- call rates to NHS Direct have continued to rise in some, but not all, of the sites examined;

- by March 2000, NHS Direct was being used in first wave areas in about 5% of health problems for which people sought unscheduled help or advice;
- a high proportion of callers – in the region of 90 per cent – follow most or all of the advice given by NHS Direct;
- the rate of “adverse events” associated with NHS Direct remains very low, confirming our previous suggestion that the service is as safe as other routes for accessing health care;
- the average cost of a call to NHS Direct, during January to March 2000, was about £15;
- the views of those in related services show a general support for the principle of NHS Direct, although there are a range of concerns about the practical implementation.

Our overview of the evidence currently available suggests to us that NHS Direct is a well-used and rapidly developing service which is appreciated by callers and, to date, has not been unhelpful to other services. Although NHS Direct handles a substantial number of calls in absolute terms, in relation to long-established immediate care services such as general practice, accident and emergency or ambulance services, its contribution is modest at present call rates.

While a great deal has been achieved in a very short time, there are a number of areas where critical self-examination or further development is needed.

We would conclude by noting that, in a context of very rapid service development and technological change, the past – and the research findings of the past – can be only a tentative guide to the future. Rising call volumes, a new decision support system, an ever expanding scope of activity and increasing public expectations create a very challenging climate within which NHS Direct must develop. The service must ensure that strong clinical governance, vigorous clinical audit, routine monitoring of activity and accessibility indicators and a diverse programme of evaluation are all in place so that NHS Direct can maintain the trust of its users and go on to develop its full potential.

## 2. INTRODUCTION

### 2.1 Policy background

NHS Direct, the national nurse-led telephone helpline, was announced in the white paper *The New NHS: modern, dependable* in December 1997,<sup>1</sup> following one of the recommendations made in the Chief Medical Officer's report *Developing Emergency Services in the Community*, published 3 months earlier.<sup>2</sup> The white paper indicated that the purpose of the new service would be to provide "easier and faster advice and information for people about health, illness and the NHS so that they are better able to care for themselves and their families". In addition, the Chief Medical Officer's report had expressed the hope that such a service might help to "reduce or limit the demand" on existing immediate care services.

The specific objectives set by the Department of Health for NHS Direct include:

- to offer the public a confidential, reliable and consistent source of professional advice on healthcare, 24 hours a day, so that they can manage many of their problems at home or know where to turn to for appropriate care;
- to provide simple and speedy access to a comprehensive and up to date range of health and related information;
- to help improve quality, increase cost-effectiveness and reduce unnecessary demands on other NHS services by providing a more appropriate response to the needs of the public; and
- to allow professionals to develop their role in enabling patients to be partners in self-care, and help them to focus on those patients for whom their skills are most needed.

The development of NHS Direct since the initial policy commitment has been rapid, and by the time of the present report the telephone service was available to the entire population of England and Wales (Table 2-1). A similar service for Scotland, NHS 24, was announced in December 2000.<sup>3</sup> As expected, the achievement of a national service now allows the use of more powerful media to promote its use, and piloting of a television advertising campaign has been taking place in south west England.

**Table 2-1: Development of the NHS Direct telephone helpline**

Date	Service development	Total population served
March 1998	First wave sites	1.3 million
January-April 1999	Second wave sites	20 million
November-December 1999	Third wave sites	30 million
June 2000	Mid and South Wales	2.2 million in Wales
October 2000	North Wales	2.9 million in Wales

November 2000	Fourth wave sites	53 million (all of England and Wales)
December 2000	Development of NHS 24 announced	Scotland, during 2001 (5 million)

The early development of the first wave sites, which are the subject of the current phase of research, was described in our first report,<sup>4</sup> and the subsequent rapid expansion of the telephone service over its first 18 months was noted in our second report.<sup>5</sup>

In September 2000 the government announced that a new clinical decision support system, known as the NHS Clinical Assessment System, would replace the three existing systems in use by NHS Direct in England by April 2001 (now revised to August 2001). It is expected that this new system will also be used to support triage in out-of-hours primary care, as well as face-to-face triage in NHS walk-in centres and in A&E departments. The fact that all call centres will now share a common core system facilitates call diversion between sites, leading to the planned creation of what is termed a “virtual national call centre” by April 2002.

At the same time as expanding the geographical coverage, other developments are strengthening the integration of the telephone service with existing NHS provision. For example, piloting of integrated access with general practice out-of-hours care began in 1999. In October 2000 the government published an independent review of GP out-of-hours services, which recommended closer integration with NHS Direct so that out-of-hours care could be accessed through a single telephone call.<sup>6</sup> Since then a new partnership between NHS Direct and the National Association of GP Co-operatives has been announced to take forward this work.

In the NHS Plan, published in July 2000, the government set out a number of new commitments relating to NHS Direct, which give a flavour of the future direction of service development and of the continuing rapid pace of change.<sup>7</sup> These are summarised in Table 2-2, below.

**Table 2-2: NHS Direct related commitments in the National Plan**

Paragraph	Commitment	Target date
1.7	NHS Direct nurses will be in regular contact to help patients manage their medicines and check that older people living alone are all right	Not stated
12.2	National telephone service	End of 2000
12.2	Health information via digital TV Over 500 NHS Direct information points	2004
12.4	New quality standards and closer integration between NHS Direct and GP out-of-hours services	2001
12.4	A single phone call to NHS Direct will be a one-stop gateway to out-of-hours health care	2004
12.5	NHS Direct will refer people, where appropriate, to help from their local pharmacy	2002
12.8	NHS Direct will help direct patients to NHS dentistry	Not stated

13.14	A free and nationally available translation and interpretation service will be available from every NHS premises through NHS Direct	2003
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As the telephone helpline has developed over the past three years, a broader vision of NHS Direct has also emerged as a diverse and interrelated set of technologies which potentially allow “direct” access to health care from the user’s home or elsewhere. According to the Department of Health, “NHS Direct is now more than just a telephone service – it is a commitment to increase people’s access to health information and advice, and empower the public to help themselves with advice and guidance from the NHS”.<sup>8</sup> In keeping with this philosophy, a range of related services are either already available or are planned, and these are summarised in Table 2-3, below.

**Table 2-3: Related NHS Direct services**

Date	Service	Description
December 1999	NHS Direct Online	NHS Direct website providing information and limited triage. <a href="http://www.nhsdirect.nhs.uk">www.nhsdirect.nhs.uk</a>
December 1999	NHS Direct Health Care Guide	Booklet providing health care advice and information. Initially cost £1.99, available free from pharmacies from November 2000
October 2000	NHS Direct Information Points	153 health information kiosks located in public places. More than 500 are planned by 2004.
2004	NHS Direct digital TV	Health information and advice via TV: two pilot projects were announced in March 2001

### **3. THE RESEARCH DESIGN**

#### **3.1 Introduction**

The Medical Care Research Unit was originally commissioned to undertake a two year evaluation of the three NHS Direct first wave sites, then known as “pilots”, beginning in December 1997. Two interim reports of this research have previously been published, in December 1998 and February 2000. This third report is the final report of this original phase of work.

The initial protocol for the research was set out in each of our previous reports. However, as NHS Direct developed, it became clear that further research would be needed beyond that included in the original protocol. Some of that additional work has been carried out and reported previously (the work on casemix included in our second report) or is reported here (the chapter on compliance in this report). However, the need for further, more detailed work on issues of service impact and triage decision making highlighted by the research to date has prompted a second phase of research, which began in January 2001, and will examine these issues over an 18 month period and in a wider range of sites. Thus, although the current report marks the completion of the original research commission, it does not mark the end of our ongoing evaluation of NHS Direct.

In addition, it has not been possible to complete definitive work on some of the issues which were included in our original protocol, in particular those relating to the impact of NHS Direct on the overall distribution of care and on pathways to first contact care. These elements of the protocol relied upon population surveys to describe changes in care distribution or to generate samples of NHS Direct callers for analysis. However, the lower than expected use made of the service in the first year has limited the value of undertaking these analyses at an early stage. Instead, further population surveys are being carried out annually and these will be analysed and reported as part of the second phase work outlined above.

#### **3.2 Results reported to date**

Previous reports have included research findings on a range of issues. For ease of reference, these are summarised below. Copies of these reports may be found on our web site: <http://www.shef.ac.uk/~scharr/mcru/nhsdreps.htm>

Issues examined in the first interim report:

- Service organisation and staffing
- Service activity (first 8 months)

- Callers' views of NHS Direct (further reported in O'Cathain A *et al.* How helpful is NHS Direct? Postal survey of callers. *BMJ* 2000;**320**:1035.)
- Variation in triage outcomes
- Impact on immediate care services
- Critical event monitoring

Issues examined in the second interim report:

- Developments in first wave services
- Service activity (first 16 months)
- Problems presented to NHS Direct
- Triage outcomes
- Impact on immediate care services (additional data reported in Munro J *et al.* Impact of NHS Direct on demand for immediate care: observational study. *BMJ* 2000;**321**:150-3.)
- Critical event monitoring

## **4. ACTIVITY OF FIRST WAVE *NHS DIRECT* SITES**

### **4.1 Introduction**

We noted in our first report that call volumes over the first 8 months of operation were about one third of that which had been expected in commissioning the service.<sup>4</sup> In our second report we found that call rates had at least doubled over the following year.<sup>5</sup> The purpose of this chapter is simply to update the call figures relating to the original populations covered, to show how the volume of use of NHS Direct is changing.

### **4.2 Data sources and their limitations**

As before, data have been extracted from the three different software systems in use for this analysis.

In previous reports we noted a number of warnings which continue to apply to this data. In brief, these are:

- It is likely that not all incoming calls to NHS Direct are logged by the CDSS software. We have no estimate of the proportion which are not logged;
- Because the CDSS data structures are complex, proprietary and different in each of these sites, the number of call records extracted may vary slightly depending on the method of extraction;
- To restrict calls to those from the original first wave populations, we have applied filters based on locational data such as postcode or telephone dialling code, which may not be present in all records.

In our last report, we extracted call data for the entire 16 month period in a single procedure, to avoid artefacts due to a change in extraction method. However, this was not practical for the current report, principally because of the rapidly increasing size of the data files. In addition, limitations in the data supplied by sites required us to filter records in a different way, as Table 4-1 indicates. These difficulties mean that individual figures should be interpreted with caution.

In addition, we have some concerns about the data from Milton Keynes, which uses the Centramax system and may be particularly vulnerable to artefactual effects related to the method of data extraction.

**Table 4-1: Source data for first wave site activity analysis**

Site	CDSS	Restriction to first wave populations (to December 1999)	Restriction to first wave populations (from January 2000)
Lancashire	TAS	Patient postcode starts PR1, PR2, PR3 2, PR3 5, PR4, PR5, PR6, PR7, WN6 0, WN6 9, WN8 7 or BL6 5.	Unchanged
Milton Keynes	Centramax	Patient STD code is 01908 Calls within 15 minutes of previous primary call about same patient are taken as "secondary" (transfers) and not counted	Patient STD code is 01908
North East	PHA	Patient STD code is 01912, 01670, 01661, 01434 or 01289	Patient postcode is in NE1-7, NE12-15, NE18, NE20, NE22-30, NE41-49, NE51-55, NE60-68, NE77, or TD15

As before, population data comes from the 1991 Census.

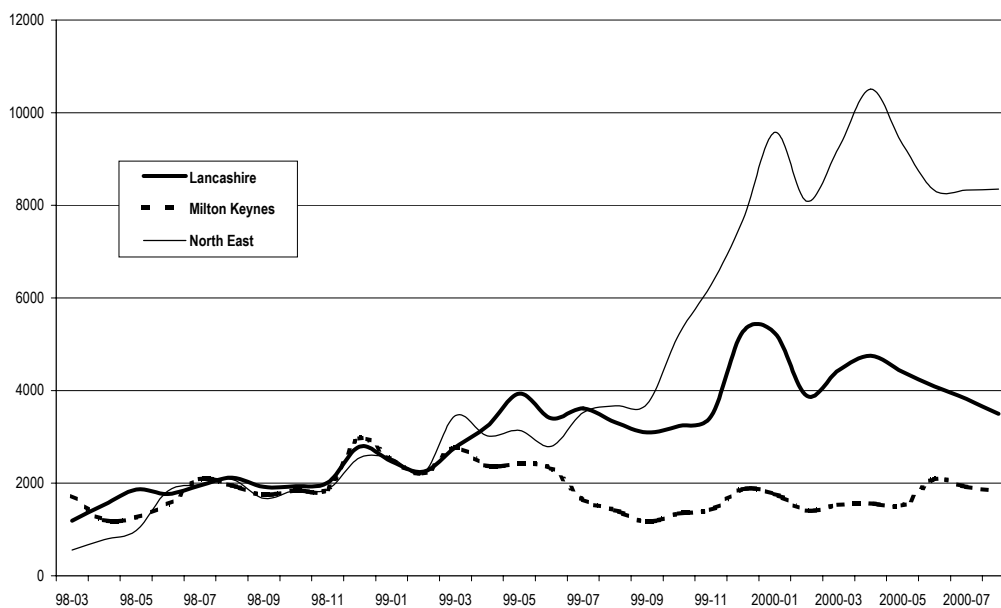
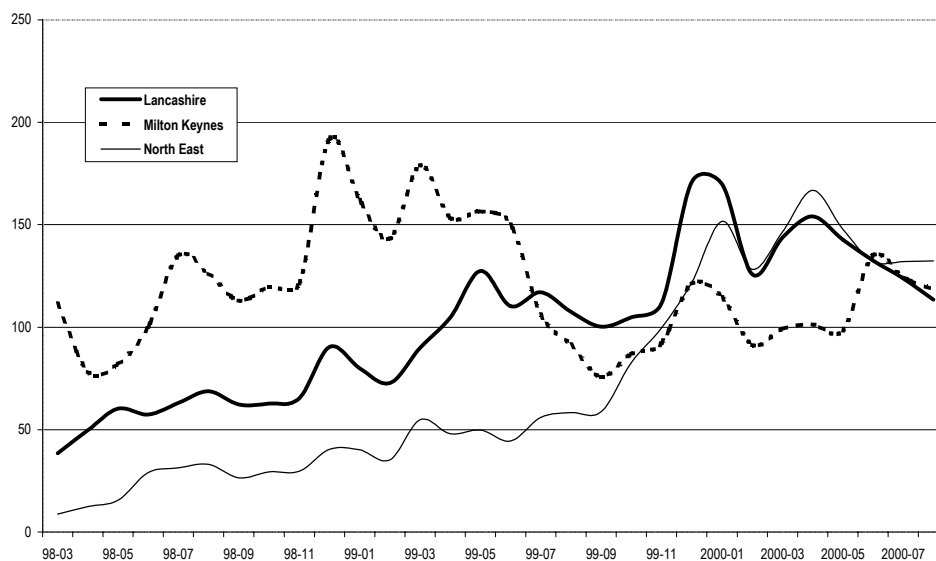
### **4.3 Call activity**

#### **4.3.1 Total call rates**

The total number of calls to each site by month, and the corresponding call rates per 1,000 population per year, are shown in Table 4-2 below. The numbers and rates are also presented graphically in Figure 4-1 and Figure 4-2.

**Table 4-2: Call numbers and rates by site and month**

Month	Call numbers			Call rates per 1,000 population per year		
	Lancashire	Milton Keynes	North East	Lancashire	Milton Keynes	North East
98-03	1188	1725	556	38.5	111.7	8.8
98-04	1533	1207	781	49.7	78.2	12.4
98-05	1859	1265	980	60.3	81.9	15.5
98-06	1767	1546	1834	57.3	100.1	29.1
98-07	1947	2085	1971	63.1	135.0	31.3
98-08	2120	1948	2078	68.7	126.2	33.0
98-09	1918	1745	1671	62.2	113.0	26.5
98-10	1936	1848	1845	62.8	119.7	29.3
98-11	2018	1873	1866	65.4	121.3	29.6
98-12	2788	2966	2544	90.4	192.1	40.4
99-01	2468	2503	2532	80.0	162.1	40.2
99-02	2245	2213	2219	72.8	143.3	35.2
99-03	2776	2763	3462	90.0	178.9	54.9
99-04	3230	2369	3022	104.7	153.4	47.9
99-05	3931	2416	3138	127.4	156.5	49.8
99-06	3399	2320	2797	110.2	150.2	44.4
99-07	3610	1639	3525	117.0	106.1	55.9
99-08	3316	1413	3670	107.5	91.5	58.2
99-09	3095	1170	3708	100.3	75.8	58.8
99-10	3235	1342	5217	104.9	86.9	82.7
99-11	3443	1426	6283	111.6	92.3	99.7
99-12	5269	1870	7676	170.8	121.1	121.7
2000-01	5240	1768	9573	169.8	114.5	151.8
2000-02	3880	1410	8090	125.8	91.3	128.3
2000-03	4436	1532	9242	143.8	99.2	146.6
2000-04	4750	1564	10514	154.0	101.3	166.8
2000-05	4403	1519	9316	142.7	98.4	147.8
2000-06	4087	2084	8324	132.5	135.0	132.0
2000-07	3818	1921	8331	123.8	124.4	132.1
2000-08	3497	1831	8349	113.4	118.6	132.4

**Figure 4-1: Calls to first wave NHS Direct sites, March 1998 to August 2000****Figure 4-2: Calls rates per 1,000 population per year, March 1998 to August 2000**

#### **4.4 Use of NHS Direct for unscheduled health care**

In our second report we described a postal population survey undertaken in each first wave area to determine the use people make of health care in response to an unplanned health event. This survey was undertaken in March 1998, before the introduction of NHS Direct, and repeated in 1999 and 2000, one and two years after the service became available. A further survey for 2001 is currently being undertaken. Data from the surveys carried out in 1999 and 2000 have been analysed to estimate the size of the contribution of NHS Direct to all unscheduled health care, and are summarised in Table 4-3 below.

**Table 4-3: Use of NHS Direct in episodes of unscheduled health care**

	March 1999	March 2000
Surveys sent	15143	15210
Usable surveys returned	10068 (66%)	9958 (65%)
Episodes of seeking unscheduled help or advice	1645	1422
Episodes in which NHS Direct was contacted	60 (3.6%)	71 (5.0%)

These data suggest that during its first two years, the contribution of NHS Direct to the totality of unscheduled care was modest. However, the data included here relate to the period before the service became a national one. It seems likely that if call rates continue to rise, then this contribution will become more substantial.

#### **4.5 Conclusions**

Data from the call logs suggest that trends in the use of NHS Direct are different in each of the first wave sites. In interpreting these figures it is important to note that we have attempted to restrict the data to that relating to a fixed population, although this restriction may not have been perfect. Nonetheless, it is remarkable that call numbers in the North East rose rapidly following the millennium new year period, and seem to have remained high since. This picture accords with local impressions of activity. The rise in Lancashire at that time was much smaller, and in Milton Keynes the data show little rise at all.

When the crude figures are translated into population call rates, it becomes apparent (Figure 4-2) that the rates in each site have converged over this period. By June 2000 the equivalent annual call rate in each site was approximately 130 calls per 1,000 people.

However, as noted at the start of this chapter, there is a continuing concern over the accuracy and completeness of the call data extracted from the software systems. NHS Direct needs reliable systems both for capturing all call activity to the logs, and for reporting all call activity in an accurate and standardised way nationally. The replacement of the first wave systems with the new NHS Clinical Assessment System will undoubtedly make the task of national standardisation of reporting easier to achieve.

The specification of a common minimum data set for call log extracts should be a priority to facilitate activity monitoring, clinical audit and research, and to ensure anonymity in data extraction. Such a minimum data set should provide records at the level of calls, rather than for example patients or episodes, and if possible should include anonymised identifiers for these entities to allow aggregation of records for analysis.

The issue of the completeness of data also remains. For completeness of call logging to be ensured the systems must be fully integrated with the telephony equipment. Systems for improving the completeness of data items captured during the call without increasing call times should also be explored. For example, patient address capture might be improved using rapid addressing systems, or caller's phone number using caller line identification.

## **5. CLINICAL ASSESSMENT: METHODOLOGICAL ISSUES**

### **5.1 Introduction**

As in all other forms of health care, it is clearly right that any advice or referral to other services offered by NHS Direct is appropriate. The idea of “appropriateness” in health care is a strong and appealing one, with a long history, and has generated much debate over many years.<sup>9</sup> Much of the impetus for this interest has come from the recognition, for at least the past 30 years, that there are persistent and substantial variations in medical practice which cannot be explained simply by variation in patients’ apparent need for care.<sup>10</sup> Given such widespread variation, the natural response is then to ask which rate of diagnosis, intervention, referral or other form of activity is “right”? However, this question is far harder to answer than might be supposed.<sup>11</sup>

We have previously demonstrated that marked variation in practice exists in the context of NHS Direct, just as it does in other health care settings. In our first report we found that variation existed between sites in triage outcomes for a sample of 119 calls presented to all three first wave sites under study.<sup>4</sup> Though such variation may have resource implications for the NHS, it is not yet known whether, in the context of NHS Direct, it leads to important differences in health outcomes for patients. We noted that such observed variation may be due to a range of factors, including such issues as the organisation of call centres, processes of call handling, the services available to which callers may be referred, the training and experience of nurses and the decision support software in use. Further work is currently in progress to define more precisely the relative contributions of the decision support system and nurse experience to this variation.

Since this more detailed work began, the government has announced that the three decision support systems currently in use in NHS Direct are to be withdrawn and replaced by a fourth system, the NHS Clinical Assessment System. This national standardisation on a single system will remove one possible source of the variation between sites. From a research viewpoint, the replacement of existing systems by a new one, with new triage algorithms, suggested to us that rather than carry out such work on systems which are no longer to be used, detailed work on the appropriateness of triage decisions should be delayed until the new system is deployed and some experience of it has been gained.

Therefore, in the first phase of research we have restricted ourselves to presenting some early work which explores some of the methodological and conceptual issues in assessing appropriateness in the NHS Direct setting. The Medical Care Research Unit is also undertaking a second phase of NHS Direct evaluation, which began in January 2001, and a major focus of this research will be the appropriateness of triage

decisions and the identification of factors which can be improved in order to enable more appropriate triage decisions. This research is not reported here.

## 5.2 Methods

The aim of the study reported here was to assess the acceptability of first contact care made by a small sample of respondents to our survey before and after the introduction of NHS Direct.

### 5.2.1 Study subjects

As described previously, we have undertaken large population surveys of the use of unplanned health care in each of the three first wave NHS Direct areas.<sup>4 5</sup> The first such survey was undertaken before NHS Direct was available (1998). Two further surveys were undertaken one and two years after NHS Direct became available (1999 and 2000). These surveys were based on random population samples, including both adults and children.

For the purposes of this study, we selected all survey respondents in 1999 and 2000 who indicated that they had sought unplanned help or advice for a health problem in the previous four weeks, and who had used NHS Direct in the course of that episode. These constituted the “cases”.

For each case, we sought up to two control respondents from the 1998 (pre-NHS Direct) survey, matched according to age, sex and the health problem for which they sought help. We attempted to match controls as closely as possible to cases, and recorded the quality of the match according to the schema set out in the table below.

**Table 5-1: Criteria for matching controls to cases**

Match quality	Sex	Age*	Problem
A	Same sex	Age within 5 years	Essentially identical statement of problem
B	Either sex	Age within 10 years	Essentially identical statement of problem
C	Either sex	Age within 10 years	Problem of similar type and severity

*\* in all cases, if the case was aged under 2 then they were matched to a control aged within one year of the case*

For each case and control, the survey provided information on the age and sex of the patient, the time of day and day of week when help was sought, how long the patient had had the problem, and a brief description of what the problem was (for example, “tooth ache”, “chesty cough” or “high temperature and headache”). In addition, the care actually sought by the patient was known from the survey. For controls, the first contact was defined as the first source of care sought by the patient. For cases, the first contact was defined as the first source sought following the call to NHS Direct.

### 5.2.2 Rating possible providers of immediate care

We used an independent “learning set” of 50 respondents selected at random from the 1998 survey (not including our control respondents) to test approaches to rating each case.

Our initial approach was to define a criterion-based “appropriateness scale” to assess the patient’s first contact care, based on whether the service provider was likely to have been able to manage the problem and whether a “less acute” provider could also have done so. Two raters independently used this scale to attempt to score the appropriateness of the first contact care of the learning set cases. However, we found great difficulty in rating cases and little agreement between raters. The lack of agreement stemmed in part from the lack of information available on the details of each case, so that in many cases severity could not be judged. A further source of disagreement was in assessing what each provider was capable of treating definitively. We therefore abandoned this approach.

Our second approach consisted of assessing each case against the four principal NHS Direct dispositions (emergency ambulance, accident and emergency department, GP, or self care), and a further disposition (pharmacy) which NHS Direct is committed to introduce.<sup>7</sup> For each case, we rated each possible disposition as “acceptable” or “unacceptable” based on working clinical experience of what each provider was able to offer, and in addition rated one disposition as “best”. This approach allowed raters to judge more than one service as acceptable for any given case. For example, for a patient with a headache a rater might judge ambulance, A&E and GP to be “unacceptable” and pharmacy and self-care to be “acceptable”, with self care rated “best”.

Using this approach four raters independently assessed the sample NHS Direct callers and their matched controls, without knowing what first contact care had actually been sought by the patient. The cases and controls were presented in random order, so that raters were blind to whether any patient was a case or a control.

All raters had working experience in clinical medicine. Two raters were specialists in A&E medicine (MC, SG), and two were health services researchers with past experience in a range of hospital specialties (JM, MP). One of these raters (MP) was also a qualified general practitioner. The degree of agreement between raters was assessed using Cohen’s Kappa statistic ( $\kappa$ ).<sup>12</sup>

### 5.2.3 Scoring first contact care

Because the raters frequently disagreed over both “best” and “acceptable” first contact care, there was no simple “right” form of care against which the actual care sought by

the patient could be assessed. To overcome this, we assessed actual care against the raters' views using three different methods, as follows.

#### 5.2.3.1 Method one: best contact score

In this method, the actual care sought was scored according to the number of raters who judged it as the "best" option. For example, a score of 1 was given if all four raters thought it best, 0.5 if two raters thought it best, or zero if no rater thought it best.

#### 5.2.3.2 Method two: cautious panel rating

In this method, the views of the four raters together were merged to form a "panel" view of acceptability. Where all four raters agreed that a particular service was acceptable or unacceptable, that view was taken as the view of the panel. However, where raters disagreed, the panel view was derived taking the perspective of the patient and seeking to minimise any risk that care may not be sufficient. In this method, disagreements between raters were resolved according to scheme set out in Table 5-2, below. For example, if the panel split 1:3 against emergency ambulance, the cautious panel rating would still deem it acceptable since one rater felt it acceptable.

The care actually sought was then compared with the panel view.

**Table 5-2: Derivation of "cautious" panel assessment**

Service rated	Number of raters judging contact Acceptable : Unacceptable				
	4:0	3:1	2:2	1:3	0:4
Ambulance	A	A	A	A	U
A&E	A	A	A	A	U
GP	A	A	D*	D*	U
Pharmacy	A	D*	U	U	U
Self care	A	U	U	U	U

Note: A = acceptable. U = unacceptable.

\* D = depends on direction of disagreement. If other ratings are more acute, then unacceptable. If other ratings less acute, acceptable.

#### 5.2.3.3 Method three: simple panel majority

In the third method, we took the view of the panel to be "acceptable" if two or more raters found the contact to be acceptable, and otherwise to be "unacceptable". The care sought was then compared with the panel view.

## 5.3 Results

### 5.3.1 Sample characteristics

From the post-NHS Direct surveys, 130 respondents were identified who had used NHS Direct for an unplanned health problem in the previous four weeks. Of these, 99 could be matched to at least one control from the pre-NHS Direct survey, and 79 to

two controls, giving 178 controls in all. Of the controls, 147 were matched at quality A, 24 at quality B and 7 at quality C (Table 5-1).

### 5.3.2 Clinician ratings

The ratings of acceptability offered by the four clinicians showed generally poor agreement. Values of  $\kappa$  for complete agreement between all four raters were in the range 0.2 to 0.4, as shown in Table 5-3. There is a generally accepted view that values of  $\kappa$  between 0.2 and 0.4 represent only “fair” agreement, with values of 0.4 to 0.6 being “moderate” and values above 0.6 being “good”.<sup>13</sup>

In addition to poor agreement over individual cases, there was evidence of systematic disagreement between rates over the proportion of cases for which various services were thought acceptable. For example, the proportion for which A&E was thought acceptable varied from 13% to 53%, depending on the rater. This suggests substantial variation between raters in the meaning they give to the term “acceptable”, quite apart from any variation in the judgement they may apply to any particular case. That such systematic difference between clinicians exists has often been noted, and in particular in studies of the appropriateness of attenders at A&E.<sup>14</sup>

**Table 5-3: Agreement between all four raters on acceptable first contact care**

First contact care	Expected agreements(due to chance) by all 4 raters	Observed agreements by all 4 raters	$\kappa$
Emergency ambulance	214	230	0.262
A&E department	51	137	0.382
General practitioner	158	197	0.331
Pharmacist	32	88	0.228
Self-care	27	77	0.202

### 5.3.3 Differences in ratings between cases and controls

Individual rater or “panel” ratings were applied to cases and controls according to the three methods set out above. For each method, comparing cases with controls showed consistent differences: cases formally triaged were less likely to agree with raters’ views than those not so triaged. In the light of the limited information available to raters in this study we do not believe that this implies that NHS Direct was providing inappropriate advice. Instead, we believe that the most reasonable interpretation of this finding is that clinicians and patients tend to come to similar judgements when information (for clinicians) or formal knowledge (for patients) is scarce. When additional information and knowledge become available, through the structured triage process used by NHS Direct, then decisions on care are systematically altered away from the position without such triage.

**Table 5-4: Effect of additional information on triage**

Clinician assessment based	Patient action given limited	Patient action given formal triage
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on limited information	information (before NHS Direct) %	(after NHS Direct) %
"Best contact" score	56	43
Panel rating, cautious	88	61
Panel rating, majority	95	79

#### 5.4 Discussion

This limited exploratory work has highlighted the difficulty of assessing appropriateness in health care and of gaining agreement between clinicians on acceptable care, particularly in the context of limited information. Surprisingly, however, recently published work has suggested that agreement between telephone triage nurses may be just as low, or lower, even when a structured decision support system is in use.<sup>15</sup>

The fact that the amount of information available in triage is clearly important in making "good" decisions raises the issue of how much information is enough. While there are obvious risks associated with collecting too little information during a call, there are also costs to both the caller and the NHS in collecting too much. Apart from the financial costs to the caller, the large number of questions asked of some callers was a source of dissatisfaction with the service in our first caller survey.<sup>4</sup> From the viewpoint of the NHS, long call lengths increase the costs of providing the service, an issue explored later in this report.

Even with adequate information, any triage decision necessarily represents a trade-off between the need to advise the patient to seek care which will maximise their chances of a good health outcome, and the need to avoid sending patients to services which are more acute than they need, since this would result in services being overloaded and unable to meet the more urgent needs of other patients. This is directly analogous to the well recognised trade-off in screening between sensitivity and specificity, and raises similar issues in evaluation.

There is some evidence, for example, that NHS Direct may err on the side of caution in directing callers to the emergency ambulance service.<sup>16</sup> This is based on a study comparing self-referred 999 ambulance users with those directed to 999 by NHS Direct. As with studies of screening, the difficulty with interpreting evidence based on cohorts who used a particular service rather than those who called NHS Direct is that we have no information on the number of callers appropriately triaged to *not* use an ambulance. Since only about 3% of callers are triaged to ambulance care, the data from the study cited is also entirely consistent with the possibility that NHS Direct has a very high specificity (i.e. low false positive rate) for directing callers to ambulances.

Similarly, recent reports have suggested that only about a half of callers directed to urgent out-of-hours primary care actually needed medical attention before the next available surgery.<sup>17 18</sup> Again, the lack of information on the number of NHS Direct callers triaged *not* to require such care, and the absence of information on whether these callers needed urgent GP attention, means that we are unable to determine the specificity of NHS Direct. In addition, in these assessments it was not clear that the appropriateness of triage was judged in a blinded way, to avoid the *post hoc* bias of knowing the ultimate outcome. To overcome this, there is now a need for studies of cohorts of NHS Direct callers, such as that planned in the next phase of research, which are able to examine disposition and appropriateness over a whole population of NHS Direct callers.

While the appropriateness of a triage decision is important, there are also other features of calls to NHS Direct which need evaluation in order to assess their quality. A principal one is the advice given to the patient for any action they should take before using health care. One of the central criticisms of NHS Direct in the *Health Which?* evaluation – which involved three actors, each with a different clinical scenario, calling ten sites for advice – was that there was wide variation between nurses in the quality and safety of self-care advice offered.<sup>19</sup> Future evaluation of the quality of advice offered is important and goes beyond a simple review of the NHS Direct protocols in use. Research on the quality of advice offered in practice, using call tapes or transcripts, or the simulated caller approach used by the Consumers' Association, would be worthwhile.

## **5.5 Conclusions**

This preliminary study of the quality of advice and referral provided by NHS Direct suggests a number of methodological lessons which any studies of appropriateness should seek to address.

First, appropriateness should be considered in relation to the objectives of the service. For example, NHS Direct could be judged against the aims of fast and easy access, better decisions about when to self-care, reduction of workload for other services, or other objectives.

Second, it must be recognised that there is no absolute standard. Experienced clinicians disagree among themselves. Consequently, simply comparing NHS Direct decisions with those of a GP co-op or an A&E department leaves us in the position of not knowing whether disagreement between services should be attributed to the co-op or A&E triage systems, or to NHS Direct. It is necessary, therefore, to use a panel of assessors representing a wide range of backgrounds and experience. Additionally, the assessment of appropriateness should be used principally to identify individual

cases where inappropriate advice might have been given. These cases can then be explored in detail to see whether there are any lessons which can be learned.

Third, judgements about the appropriateness of advice depend on the nature and amount of information that is available at the time the decision is taken. Thus, at least two separate steps need to be carried out. First, to make assessments in the light of information that was available at the time the actual advice was given. This allows a judgement of the appropriateness of the advice. But, second, judgements should be made in the light of all the information that could have been obtained at the time the actual advice was given. This will enable judgements to be made and lessons drawn out about whether the information actually obtained was sufficient.

Finally, the types of prioritisation and clinical assessment decisions made by NHS Direct can be viewed as a screening test. The sensitivity of the "test" (for example, the proportion of patients needing immediate care who were correctly identified) and the specificity of the "test" (the proportion of patients correctly advised against seeking immediate care) should be assessed. This is particularly important if the true impact of NHS Direct decisions on other services is to be judged. In effect, this means that appropriateness (as an assessment of the validity of impact) cannot be judged simply by looking only at cases referred to certain services. Instead, a "population" approach is necessary.

The Medical Care Research Unit is attempting to put these principles into practice in phase two of the evaluation of NHS Direct. The aim of this part of the research will be to identify cases in which the advice or referral was inappropriate, and to see if there are any patterns which suggest lessons which can be learned about the provision of accurate telephone triage.

## **6. COMPLIANCE WITH ADVICE GIVEN BY NHS DIRECT**

### **6.1 Introduction**

NHS Direct nurses use computer decision support systems to help them determine the advice to offer callers. The advice usually includes information on which health care provider to contact and the urgency with which to contact them, or on how the caller can care for the problem themselves. However, one cannot assume that the caller will necessarily hear, understand, agree with or act on the advice offered by the nurse. In an earlier study, we found that 85% of callers say they comply with all of the advice given, and a further 13% with some of it.<sup>20</sup> This appears to compare well with other studies of compliance with telephone health care advice.<sup>21 22 23 24</sup> However, previous research also suggests that there might not be straightforward agreement between the advice the nurse offers, the advice the caller believes they have been given and the course of action they then take.<sup>24</sup>

### **6.2 Methods**

For each of the three first wave sites, anonymised call log data were obtained for one week in June 1999. Only calls from the original first wave areas which were triaged by a nurse were included. One researcher (JFM) randomly selected 100 calls from each site, giving a total of 300 calls. Each site was asked to retrieve and transcribe the tape recording of each selected call verbatim, omitting any personal identifying details. The anonymised transcripts were sent to the research team, and each was read by two coders independently. The recommendation made by the nurse was recorded on a structured data collection form, and the coding compared between coders. One researcher (AOC) resolved any disagreement between coders by reference to the original transcript.

Within one week of each call, the appropriate NHS Direct site also sent a postal survey to the caller. Up to two reminders were sent to non-respondents. The questionnaire used fixed format questions to determine the advice the caller believed they had been given and the action they had then taken. In addition, the caller was asked to describe both the advice given and the action taken, in their own words.

In this way, we used the call transcript to determine the advice offered by the nurse, and the postal survey to determine both the advice heard by the caller and the action they took. In addition, data from our first caller survey were analysed further to explore compliance with advice given in greater detail.<sup>20</sup>

### 6.3 Results

#### 6.3.1 Response rates

Of the 300 calls selected, 267 tape recordings were located: 96 for Site A, 95 for Site B and 76 for Site C. Site C was unable to locate recordings for those calls where a nurse phoned a caller back who had called when the nurses had been busy. Their system for recording calls is being replaced to ensure easy access to recordings in the future. On occasions where the nurse interrupted the call to talk to a service provider and called the patient back, this follow up call was obtained. Nine transcripts were incomplete because follow-up calls could not be located or because the tape had run out and the next tape could not be located. In all, recommendations were available for only 258 calls.

Questionnaires were sent to 291 of the 300 callers selected. Addresses were not available for four calls and five calls were from repeat callers. 200 questionnaires were returned completed, 2 were refusals, 1 caller had died and one did not reach the caller. The overall response rate was 69% (200/289), with rates of 66% for Site A, 71% for Site B and 71% for Site C.

#### 6.3.2 Linking the data

Before linking the data from the transcript with that from the postal survey, one researcher (AOC) read the two pieces of information for each call to ensure that they did in fact relate to the same call, since some callers in the sample had made multiple calls to NHS Direct in the past month. If there was any concern that the survey was not related to the transcript, then these were excluded. After matching transcript and survey data together, complete data were available for 52% (155/300) of the selected calls (Table 6-1).

**Table 6-1: Completion of call transcript and survey data**

	Survey related to transcribed call	Survey probably related to another call	Survey not returned
Transcript completed	155	13	85
Transcript partly completed	4	2	4
Transcript not available	24	0	13

#### 6.3.3 Correspondence between nurse advice and patient action

Overall, 75% of people (114/152, 95% confidence interval: 68% to 82%) followed the advice given by the nurse, and 25% did not. Although Table 6-2 below suggests that compliance *may* differ depending on the advice given, the study was not powered to detect such differences and the variation shown in the table is not statistically significant.

**Table 6-2: Reported compliance by type of advice**

Advice given	Callers given this advice n	Advice followed n (%)	Advice not followed n (%)
999	2	2 (100%)	0 (0%)
A&E	25	21 (84%)	4 (16%)
GP urgent	42	26 (62%)	16 (38%)
GP routine	25	19 (76%)	6 (24%)
Self care	54	42 (78%)	12 (22%)
Other	4	4 (100%)	0 (0%)
<b>Total</b>	<b>152*</b>	<b>114 (75%)</b>	<b>38 (25%)</b>

\* 3 respondents to the questionnaire did not state the action they took.

#### 6.3.4 Reasons for lack of compliance

The reasons for non-compliance were unclear for 11 calls and may have been due to the survey respondents misinterpreting the options available on the questionnaire. We excluded these from the analysis, due to our lack of confidence that these callers had not complied.

We classified the remaining 27 calls into three categories, according to the reason why there seemed to be a lack of correspondence between the nurse's recommendation and the caller's action. The categories were:

- **intentional non-compliance:** the caller actively decided not to act on the advice given (13 calls);
- **inadvertent non-compliance:** the caller appeared to believe they were acting on the advice, but their action did not correspond with the advice recorded on the transcript (4 calls);
- **changing circumstances:** some callers were given advice to self care or see a GP routinely, but if the condition worsened to contact a service, or do so more urgently, which they then did (9 calls).

In the remaining call, a caller was given two options and chose one of them.

One might reasonably argue that the "true non-compliers" were those who *actively* disagreed with the advice given, i.e. 13 of 141 callers (9%). This would increase the overall proportion of compliers to 91% (128/141, 95% confidence interval 86% to 96%). The data are presented by advice given, using this more restrictive definition, in Table 6-3. Intentional non-compliance appears to be higher among those callers advised to contact a GP urgently than for others, but the absolute numbers are small.

**Table 6-3: Intentional non-compliance by type of advice**

Advice given	Callers given this advice* n	Advice followed n (%)	Advice not followed* n (%)
999	2	2 (100%)	0 (0%)
A&E	24	22 (92%)	2 (8%)
GP urgent	33	26 (79%)	7 (21%)
GP routine	25	24 (96%)	1 (4%)
Self care	53	50 (94%)	3 (6%)
Other	4	4 (100%)	0 (0%)
<b>Total</b>	<b>141</b>	<b>128 (91%)</b>	<b>13 (9%)</b>

\* excluding calls where non-compliance was not clear

\* includes only intentional non-compliers

### 6.3.5 Why do some callers not comply?

There may be many reasons why a caller may be unable or unwilling to follow the advice received from an NHS Direct nurse. In principle, a thorough investigation of this question would require asking non-compliant callers about the issues which influenced their course of action after receiving advice. However, the call transcripts available do offer some insight into why callers may be reluctant to follow the advice given. Here, we have chosen to classify caller's reasons for non-compliance into three broad groups, based on our interpretation of each call, and we have added a fourth group for inadvertent non-compliance. Although these may not be rigorously defined or mutually exclusive, they form a useful organising schema for present purposes. Examples of calls falling within each group follow in the sections below.

#### 6.3.5.1 Reasons relating to the caller's domestic or social relationships

Some callers found the advice given by NHS Direct inconvenient or impossible to follow because it conflicted with existing social or domestic commitments or relationships, as the cases below demonstrate. In the first following the advice was inconvenient, while in the second it was disruptive. In the third and fourth cases the caller accepted the advice but the patient did not.

#### Case 6-1

A patient called NHS Direct on a weekend morning with abdominal pain. The nurse recommended that they contact their GP now and self care in the meantime. On the questionnaire, the patient said that they found the advice quite helpful but had a social engagement that day and decided to wait until Monday before contacting the GP. The GP confirmed the advice given by the nurse.

#### Case 6-2

A caller rang NHS Direct on a weekday evening about a child with a headache. The nurse recommended that they make an appointment with a GP as soon as possible. The caller expressed concern about this because they had no transport and their other child was asleep. After consultation with a colleague, the nurse recommended seeing the GP in the next three days. The nurse gave the caller self care advice and the danger signs to look for and arranged a call back. On the questionnaire, the caller said that they had been given this advice, that the nurse had called back and that the child was fine by morning. The caller did

not find the advice very helpful and undertook self care. They said that they felt that everything was constrained by the computer and that the nurse had simply read answers from the computer.

### Case 6-3

A caller telephoned NHS Direct on a weekday morning about a patient, their parent, who had constant headaches. The patient had recently come out of hospital and had seen their GP the previous day. The nurse recommended that the patient be checked out that day. The caller said that they were going to casualty anyway that day so would take the patient there. On the questionnaire, the caller said that they were advised to go to A&E but that the patient had wanted to contact their GP. The patient's condition worsened while waiting for their GP and they called 999.

### Case 6-4

A caller telephoned NHS Direct on a weekday afternoon about an overdose taken by a family member. Their relative refused to go to hospital. The nurse called the poisons unit and said that the patient should be seen in A&E and if that was not possible then an alternative was a visit to or by the GP. The nurse stressed that A&E was the best option and that the patient could call NHS Direct themselves. On the questionnaire, the caller said that they had been given this advice, found it very helpful but the patient refused to go to A&E.

#### 6.3.5.2 *Reasons relating to the caller's relationship with NHS Direct*

The second category relates to callers whose non-compliance seemed to relate to their understanding or experience of NHS Direct itself. In the first two cases, callers seemed to expect more of the service – more detailed information, or a diagnosis – than was available. In the third and fourth cases, callers seemed to feel that their condition warranted more than NHS Direct had suggested. In the fourth, in particular, the caller seemed to have a strong prior belief about the course of action required.

### Case 6-5

A patient called NHS Direct early on a weekday evening wanting to know about the availability of treatments for their illness. The nurse explained that only a doctor could deal with those questions. The patient asked whether they were speaking to a nurse. The nurse explained that they were, and continued to give the patient information. On the questionnaire, the patient said they were told to contact a GP at the next appropriate opportunity. They did not find the advice very helpful and saw their GP. The patient was unhappy with the lack of information the nurse could give.

### Case 6-6

A patient called NHS Direct on a weekday afternoon with back pain. They had visited their GP on a number of occasions about the problem and been told to take painkillers. They called NHS Direct because they wanted to know if their symptoms were normal or whether they needed to see a GP again. The nurse recommended that the patient returned to see their GP. The patient asked if they could be given a better idea of how serious the condition was. After some discussion the patient asked if they should contact the GP as an emergency. The nurse said not. The patient asked for a diagnosis, which the nurse said they could not give. The patient expressed concern about the lack of attention given by their GP and explained that their relationship with their GP was not a good one. The nurse explained that A&E was an alternative. The patient interpreted this to mean that the problem was serious and the nurse again explained that no diagnosis could be made. The nurse encouraged the patient to go to their GP that day and if they could not get an appointment then to go to A&E that day. The caller said "yes I will definitely". On the questionnaire, the patient said they were told 'to contact a GP at the next appropriate opportunity'. They found the advice very helpful and undertook self care.

### Case 6-7

A patient called NHS Direct on a weekday morning with a toe injury. The nurse recommended self care and if it got worse to go to the GP for antibiotics. On the questionnaire, the patient said that they were told to self treat. They did not mention that they were told to see their GP if things got worse. They said they did not find the advice very helpful and went to the GP for some ointment.

### Case 6-8

A caller telephoned NHS Direct on a weekend evening about a family member with an eye problem. The caller felt that a doctor was needed. The nurse recommended self care but the caller wanted a GP to visit

them. The nurse recommended that the caller phone again if the condition worsened. The caller repeated that they wanted a doctor. The nurse said that they could contact a GP but that this was not her recommendation. The nurse gave more self care advice and said to contact a GP if the condition did not clear up. On the questionnaire, the caller said that they were given self care advice and did not find this very helpful. They contacted their GP the next day and got a home visit.

It is possible that this last caller may have though they had telephoned their GP out-of-hours service. For example, they may have been directed to NHS Direct via a recorded message on their own doctor's answer-phone, and this raises the important issue of caller expectation as one factor influencing both compliance and satisfaction. Given that further integration between NHS Direct and out-of-hours primary care is planned, clear communication to callers about what they can expect of the service will be necessary.

### 6.3.5.3 *Reasons relating to the caller's relationships with other services*

In the third category we have included cases of non-compliance which seem to be the result of the caller's pre-existing experience of or ongoing relationship with the service which NHS Direct is advising them to contact. In the first four, there is a reluctance to contact a GP out-of-hours, though the reasons for this are not always clear. In the fifth, the caller has an existing appointment with a GP which they wish to honour.

#### **Case 6-9**

A patient called NHS Direct on a weekend morning with a swelling. The nurse recommended that the patient see a GP within four hours and undertake self care in the meantime. The patient accepted the advice. On the questionnaire, the patient said that they were advised to contact a GP in the next 24 hours and told how to treat the problem themselves. They said that they found the advice quite helpful but treated the problem themselves because they did not like seeing the doctor and it was a Sunday.

#### **Case 6-10**

A patient called NHS Direct on Saturday morning wondering if they could take a particular medication. They had already consulted a pharmacist about it. The nurse recommended they call the GP and a discussion ensued about whether the service was for emergencies only. The nurse said that if the out-of-hours service could not help then they should see their own GP on Monday. On the questionnaire, the patient said they were told to contact a GP in the next 24 hours, found this quite helpful and did it.

#### **Case 6-11**

A caller telephoned NHS Direct on a weekend afternoon about their child vomiting. The nurse recommended that the caller 'have a word with a doctor in the next few hours'. The caller had already phoned the doctor and found the NHS Direct number on the GP's answer phone. The nurse checked the procedure about out of hours care provided by that GP and gave the caller instructions. On the questionnaire, the caller said that they found this advice very helpful but wanted to wait until after the weekend before contacting the GP. They undertook self care.

#### **Case 6-12**

A patient called NHS Direct on a weekday evening with a toe injury. The nurse recommended that the patient see a GP in the next few hours, that it would be an out-of-hours call, and gave self care advice in the meantime. The patient explained that they had moved house and thus their GP was unlikely to make a home visit. On the questionnaire, the patient said they were told to self treat and contact the GP the next day. They found the advice quite helpful and undertook self care.

#### **Case 6-13**

A patient called NHS Direct on a weekday, during the day, with a skin complaint. The patient said that they had an appointment with their GP the next day. The nurse advised them to see the GP that afternoon. On the questionnaire, the patient said that they were told to contact a GP in the next 24 hours. They found the advice quite helpful and contacted the GP in 24 hours.

#### 6.3.5.4 *Inadvertent non-compliance*

In a further four cases it appeared that the caller believed they had complied with advice when they had not. From the transcripts alone it is not possible to be certain about why this happens. In two cases the transcripts demonstrate ambiguity in the advice given by the nurse. In the first, multiple alternative actions are suggested, while in the second no level of urgency is explicitly stated. In the third and fourth cases the caller seems either to mishear or misinterpret what the nurse has said.

##### **Case 6-14**

A patient called on a weekday evening because they were unsure whether they had taken a drug. The nurse consulted a colleague and felt that the patient had forgotten to take the drug. They advised "to be on the safe side you could ring through to the emergency GP." Then the nurse recommended that the patient keep a close eye on things and ring the GP in the morning if things were not normal, then to wait two hours and check blood sugar levels, then to ring the out-of-hours GP, then to keep a close eye on it. On the questionnaire, the patient said they were told to wait and see, to keep assessing the problem and call back if things got worse. They found the advice quite helpful and treated the problem themselves.

##### **Case 6-15**

A patient called NHS Direct on a weekday morning with an injured knee. The nurse recommended that the patient 'get an appointment' with their GP and self care in the meantime. The nurse said that if the patient could not get a GP appointment then to rest the injury. On the questionnaire, the patient said they were told to contact a GP immediately and to self care. They found this advice quite helpful, contacted the GP immediately, told the GP that they had rung NHS Direct and got an immediate appointment. The GP sent them to A&E and said that the visit had been a waste of time.

##### **Case 6-16**

A patient called NHS Direct on a weekday afternoon to see whether they should exercise with an injury. The nurse said that they had a long wait ahead, and would need to wait 6 to 8 weeks before getting GP advice prior to exercising. On the questionnaire, the patient interpreted this as contact a GP the next day, found the advice very helpful and made an appointment with their GP the following day.

##### **Case 6-17**

A patient called NHS Direct on a weekday evening with an ear complaint. They had tried to book an appointment with their GP but could only get one in six days time. The nurse recommended that they see a pharmacist and undertake self care while waiting. The patient thought they had been told to see the GP within 24 hours, found it helpful advice and followed it.

#### 6.3.6 Callers' views of their compliance with advice

When we previously asked callers about their compliance with advice, 85% said that they complied with all of it.<sup>20</sup> Exploring this further in Table 6-4 below, the data suggest that callers recommended to contact a service routinely rather than urgently were *less* likely to comply with all of the advice given, which appears to contradict the evidence presented in Table 6-3 above.

**Table 6-4: Callers' views of their compliance with advice, by advice given**

	Callers given this advice	Complied with all	Complied with some	Complied with none
999 or A&E	145	132 (91%)	7 (5%)	6 (4%)
GP urgent	133	120 (90%)	11 (8%)	2 (1%)
GP routine	211	163 (77%)	42 (20%)	6 (3%)
Self care	174	147 (85%)	23 (13%)	4 (2%)
<b>Total</b>	<b>663</b>	<b>562 (85%)</b>	<b>83 (13%)</b>	<b>18 (3%)</b>

$\chi^2 p < 0.001$

In addition, the analysis in Table 6-5 below suggests that when a caller's expectation of the advice they will be given is not matched by the advice they receive, they may be less likely to follow all of the advice.

**Table 6-5: Callers' views of their compliance with advice, by expectation**

Advice given	Callers given this advice	Complied with all	Complied with some	Complied with none
matched expectation	348	309 (89%)	35 (10%)	4 (1%)
less urgent than expected	99	80 (81%)	17 (17%)	2 (2%)
more urgent than expected	185	151 (81%)	25 (14%)	9 (5%)
<b>Total</b>	<b>632</b>	<b>540 (85%)</b>	<b>77 (12%)</b>	<b>15 (2%)</b>

$\chi^2 p < 0.05$

This is an important issue in considering the marginal impact which NHS Direct might have either on health or health services. If NHS Direct is to discourage inappropriate demand for health services, then clearly the advice it gives must be complied with when the service disposition is less urgent than the caller expected. Conversely, if NHS Direct is to improve patient health outcomes then its advice must be followed when it is more urgent than expected. These are the situations in which NHS Direct can make a difference to "what would have happened anyway", and the evidence available suggests that compliance is about 81% in this case.

High levels of compliance when the advice is in line with the caller's pre-existing intention are, on this argument, irrelevant.

### 6.3.7 Accuracy of software log

This study also offered an opportunity to compare the advice offered by the nurse (evidenced by the call transcript) with that recorded in the software log.

Two issues emerged about the way in which the three software systems in use recorded some of the calls. First, some calls did not have a recorded disposition or

were classified as 'aborted', although from the caller's point of view (evidenced by the postal survey) a course of action, such as seeing their GP or attending A&E, had been suggested to them. Second, on occasion the endpoint recorded in the log did not reflect the recommendation given to the caller. If a caller was given two options, only one was recorded; callers who were recommended to speak to a health visitor or district nurse were classified as self care; and callers recommended to self care and contact a GP if the problem worsened were classified unpredictably – sometimes as self care and sometimes as GP. Overall, this effect tended to be to under-record the true rate of referral to other services by NHS Direct. This clearly an important issue if monitoring of referral activity is to be accurate.

It may be the case that these difficulties in recording the advice actually given to some callers result from inbuilt limitations in these systems in how advice *can* be recorded. Given that the advice offered can be complex, conditional or refer to diverse services, and the advisor may over-ride an endpoint of the triage support software, it may be necessary to review how the record of advice is represented in the new NHS Clinical Assessment System, and how it is used in practice by advisors, to avoid misrepresentation and under-recording of the true prevalence of recommendations to contact services.

#### **6.4 Discussion**

Compliance with NHS Direct advice appears to be high, with at least three quarters of callers apparently following all of it. This may be an overestimate, because in this study we did not check the actions callers reported they had taken, which would have required contacting the services they were recommended to visit. Reliance on patient self-report tends to overestimate compliance with treatment.<sup>25</sup>

The compliance levels reported here should be seen in the context of compliance rates for other forms of health care, which vary widely. For example, compliance with outpatient attendances is about 88% nationally,<sup>26</sup> with recent studies reporting compliance rates of 66% with booked paediatric outpatient clinic appointments,<sup>27</sup> 84% with plastic surgery clinic appointments,<sup>28</sup> and 97% with first assessment/treatment visits to a colposcopy clinic.<sup>29</sup> Compliance with prescribed treatment also varies, with 80-94% of patients redeeming their prescriptions,<sup>30</sup> and between 33% and 94% complying with long-term medication.<sup>25</sup>

Rather than seeing non-compliance as a failure on the part of the caller or patient to follow instructions, it may be more productive to try to understand why people are unable or unwilling to comply with advice or treatment.<sup>25 31</sup> One model of non-compliance with medical regimes includes patient-provider communication, knowledge of medication regimen, satisfaction with provider, internal locus of control, perceived social support and treatment disruption of lifestyle as relevant issues.<sup>25</sup>

Such factors may also be relevant in the NHS Direct setting. For example, among the examples above we have noted cases in which there was evidence of poor communication between a nurse and caller where the nurse gave four different types of advice; evidence of disruption of lifestyle for the caller who delayed contact with a service because they had a social event to attend; evidence of a lack of perceived social support for the caller who could not leave the house with a sick child because another child was asleep; and lack of satisfaction with or trust in the service provider for the caller who questioned whether the person they were speaking to was a nurse.

In addition, callers begin with some idea of what they should do and may disagree with or resist the advice given if it differs from their prior expectation. There also appears to be some resistance to contacting a GP urgently, which is consistent with the comments made by respondents to a previous caller satisfaction survey that they do not like “wasting the time” of the GP.<sup>20</sup>

A previous study of compliance with advice given over the telephone by A&E nurses found large discrepancies between callers’ expectations, the advice recorded by the nurse, the advice heard by the caller and the action taken.<sup>24</sup> Without an objective record, such as tape recordings, of the content of the calls in that study it was impossible to judge the extent to which these differences were explained by communication skills, inaccuracy of recall, low adherence to advice or poor record keeping. We had tape recordings of calls available in our study and have been able to show that, in the main, nurses are clear about the advice they give, patients hear this advice accurately and some choose to act differently for a variety of reasons.

#### 6.4.1 Limitations of this study

Not all of the 300 calls randomly selected for this study could be included. Some call tapes could not be retrieved, mainly due to the poor system in place in one site, leading to missing call transcripts. This site was actively addressing this problem while we were undertaking this study, and it is unlikely that the missing calls would have led us to different conclusions.

In addition, not all callers returned a postal survey. The 69% response rate to the survey could have introduced some bias if non-respondents are also more likely to be non-compliers with advice. If this were the case then our results would tend to over-estimate the true compliance rate. We are also reliant on the caller’s ability to recall both the advice received and the action taken.

In the postal survey, we were not entirely satisfied that the questionnaire options we used to elicit callers’ views of the advice they had been given and had taken were able to represent the true picture, since this often turned out to be more complex than we had expected. For example, callers are frequently offered more than one course of

action, or alternative courses of action depending on the progress of their condition. Telephone interviews – as used in another study of nurse telephone advice<sup>24</sup> – may be a better way forward for determining the advice callers believe they have been given.

To avoid the problem of over-estimating compliance through using callers' self-reports, we could have checked whether callers actually attended a service and when they did so. However, callers' permission would have been required to access GP and A&E records, and we know from other elements of this evaluation that this can result in low response rates and a rapid loss of study subjects. Nonetheless, it may be possible for sites to take forward such follow-up studies on a local basis in partnership with other services.

#### 6.4.2 Conclusions

Overall, our results suggest that caller compliance with the advice offered by NHS Direct is high, and generally compares well with compliance with suggested course of action in other health care settings. The rate of intentional non-compliance is low, and as we have argued above, such non-compliance may be understood in terms of the impact of the advice on the caller's current domestic or social situation, their existing relationships with other service providers, or the nature of their relationship with NHS Direct. There are a small number of cases where non-compliance with advice is inadvertent.

Although compliance is generally high, understanding more about reasons for non-compliance may be valuable in helping NHS Direct to further improve the service it offers. In addition, our experience of undertaking this study prompts us to suggest a number of areas where improvements might be made.

First, all sites should review their arrangements for both recording and retrieving taped call records. Such arrangements should be able to accommodate the fact that a single episode of care by NHS Direct may span a number of related calls (some of which may be inbound, and some outbound), and thus may be recorded in more than one physical location.

Second, in a small number of cases the advice offered was ambiguous or confusing. In particular, callers who are advised to see a GP sometimes seem to be uncertain about how soon they should do this. Phrases such as "as soon as possible" or "the next appropriate opportunity" may mean widely different things to different callers, although there is some indication that callers tend to err on the side of urgency. To avoid such ambiguity, the service advised, the timescale, and whether out-of-hours care is necessary should all be explicitly stated by the nurse.

Third, some callers were both dissatisfied and non-compliant because their expectations of NHS Direct (for a diagnosis or for detailed clinical information) went beyond what the service currently offers. Clearer public communication about the nature of the service, and the limits of what is being offered, would therefore be worthwhile.

Fourth, computer systems for coding the advice offered to the caller should be reviewed to ensure that all important dimensions of the advice – such as destination, urgency and alternative possibilities – can be easily, accurately and consistently recorded by advisors.

## 7. CRITICAL EVENT MONITORING: UPDATE

### 7.1 Introduction

As we have argued in our previous reports, there may be occasions on which callers receive advice from NHS Direct which leads them to use services which they do not need (over-triage), or dissuades them from using services which they do need (under-triage). In the former case, while there is unlikely to be any immediate adverse health consequence for the patient, there may be inconvenience and there will also be an additional and unnecessary demand on health services. In the latter case, the patient may suffer a poorer health outcome as a result, and this is the focus of the current chapter.

Our research to date has concentrated on identifying “critical events” in which a poor health outcome followed a call to NHS Direct. We have previously noted that a full clinical audit of such cases, or a “confidential enquiry”, is beyond the scope of the current research, which is limited simply to estimating the frequency of such events. Further research, discussed below, will address the issue of over-triage and under-triage in much greater detail.

### 7.2 Methods

In the current phase of research our approach has been to rely on existing sources of expert local knowledge to identify cases where a poor health outcome has followed contact with NHS Direct, and the call was not triaged to a high level or urgency. These sources are shown in the table below. Contact was made with all coroners, A&E consultants and NHS Direct call centre managers in the first wave areas in November 2000.

**Table 7-1: Data sources for critical event monitoring**

Source	Data collection
Local press reports	Surveillance of local press reports for two years following the launch of first wave sites
Coroners	Contact with local coroners to identify any unexpected death in which advice from <i>NHS Direct</i> was sought in the period before death
A&E consultants	Contact with A&E consultants
NHS Direct centre managers	Contact with site managers

### 7.3 Results

At the time of our second report two cases had been reported to us in which a serious clinical outcome followed contact with NHS Direct. We add one further case in this report, described in outline below.

Case	Patient	Problem presented to NHS Direct	Advice given	Outcome	Diagnosis
C	4 year old boy	Child swallowed a coin	No action necessary since no symptoms	Child developed difficulty swallowing. X-ray in A&E showed coin lodged in throat. Removed by endoscope	Pharyngeal impaction of coin

### 7.4 Discussion

At the time of our last report we had noted two “critical events” in the context of approximately 100,000 calls, giving an event rate of about 0.002%. At the time of the current enquiry 283,597 calls had been logged to NHS Direct from the first wave areas, and three critical events identified. Our updated estimate of the event rate would therefore be 0.001%.

Although there is only limited research evidence available, we have noted critical event rates in other triage settings to be perhaps 0.2 to 0.5%.<sup>5</sup> Set in this context, the experience of NHS Direct is clearly reassuring. It is obviously possible that we have failed to identify further cases where poor health outcomes have followed a call to NHS Direct, either because they are unknown to our local sources or have not been reported to us. However, the number of such cases would have to be at least two orders of magnitude (i.e. 100 times) greater before it became comparable with event rates reported elsewhere. Some further evidence is available from an evaluation of the NHS Direct Hampshire site, in which coroners records and call data were examined over a six month period to identify deaths occurring within seven days of a call to NHS Direct.<sup>32</sup> In that study, 18 of 19,335 callers (0.09%) died within seven days of contacting the service, though these deaths were not necessarily unexpected.

It is important to note that this estimate of critical events does not provide any guide to the frequency of “inappropriate advice” by NHS Direct, since a very large proportion of problems presenting to the service are acute self-limiting conditions for which any poor health outcome would be very rare.<sup>5</sup> Thus, the rarity of serious critical events following calls may be attributable to the casemix as well as to the quality of advice given.

### 7.5 Conclusions

These results confirm the picture presented in our previous report, and suggest that access to health care through NHS Direct is as likely to be at least as safe as access through other routes. More detailed exploration of the frequency and consequences of

over-triage or under-triage by NHS Direct will be a central issue in a second phase of research which is now under way.

## **8. THE ECONOMICS OF NHS DIRECT**

### **8.1 Introduction**

The aims of the economic analysis are to measure the operating and other immediate direct cost consequences of the service. In the first part of this chapter we report the results of a cost analysis of NHS Direct. The primary analysis estimates the mean economic cost per call at each of the three first wave sites, for the period April 1999 to March 2000, on a monthly basis.

The second part of this chapter examines the cost implications of changes in the pattern of demand for other immediate care services. In a sensitivity analysis we estimate some of the cost consequences of NHS Direct, based on its potential impact on other services. In addition, in a threshold analysis we quantify the reductions in level of demand for other immediate care services that would be required to offset the costs of providing NHS Direct.

### **8.2 Methods**

#### **8.2.1 Measurement and valuation of resources**

All costs were identified from the perspective of the NHS. Resources were valued using the concept of opportunity cost: that is, any decision to use resources to satisfy a particular health care demand must involve sacrificing the opportunity of obtaining the benefits of using the same resources to satisfy other health care demands. So, although some resources might not have an associated financial cost – for example, nurses' time spent in training – there is an economic (or opportunity) cost since the nurses' time could have been used to handle calls. For this reason economic costs will often differ from accounting costs as shown on financial budget statements.

Wherever possible all identified resources were measured in natural units such as number and grade of nurses employed. For practical reasons market values, such as nurses' annual gross salaries, were used as proxies for opportunity costs and can only be considered approximations. Table 8-1 describes the measurement and valuation of relevant resources. All resource-use and cost data were provided by NHS Direct sites.

Throughout the analysis no distinction is made between the marginal and average costs of immediate care services. Marginal cost is the extra cost of producing one extra unit of output, while average cost is the total cost of a service divided by the total output. The two can differ quite significantly. For example, once an A&E department is established the additional cost of treating one more patient is relatively small given that costs of buildings, staff and overheads have already been incurred. Ideally all economic analysis, which focuses on the effects of small changes in output, would

use marginal analysis. However, given data limitations average costs are used as proxies for marginal costs.

**Table 8-1: Measurement and valuation of resources used by NHS Direct**

Resource	Measurement	Valuation
<i>Annual capital costs</i>		
Nurse training time	Number of weeks	Annual gross salary*
Call operator training time	Number of weeks	Annual gross salary*
Trainer time	Number of weeks	Annual gross salary*
Buildings	Number and type	Purchase price
Computers	Number and type	Purchase price
Software	Type	Purchase price
Communications	Type of infrastructure	Purchase price
Other capital costs e.g. legal services	Services provided	Fees as per invoice
<i>Operating costs</i>		
NHS Direct staff	Number, type and grade	Annual gross salary*
Non-NHS Direct staff	Specialist service provided	Fees as per invoice
Accommodation	Buildings: number and type	Rental/lease price
Communications and IT services	Services provided	Fees as per invoice
Overheads	Recruitment, stationary etc	Fees as per invoice

\* Includes employer on-costs

### 8.2.2 Estimating costs per call

The mean cost per NHS Direct call is defined here as the total economic cost to the NHS of providing the service, divided by the total number of logged calls in the same period. Total costs comprise capital and operating cost elements. The former include resource items whose costs were incurred in one year but whose benefits will be experienced over a number of years: for example, staff training, computer equipment and new buildings. For each capital outlay, an equivalent annual cost was estimated based on the expected life of the facility.<sup>33</sup> This means that all capital costs could be expressed on an annual basis (See Appendix A). Operating costs comprise costs that are incurred on an annual basis. These include such things as staff salaries, accommodation rental and computer maintenance costs.

All three first wave sites were in transition over the period being investigated: April 1999 to March 2000. Given the substantial increases in populations served by each site over this period, and the concurrent increases in resource use, a monthly cost analysis was considered to be the most appropriate for exploring changes in mean cost per contact over time.

### 8.2.3 Sensitivity analysis

A series of sensitivity analyses explored the impact of potential changes in demand for other immediate care services brought about by the introduction of NHS Direct. In particular, the analysis focuses on the potential impact on health service costs of a

reduction in demand for A&E and GP co-op services, as well as emergency ambulance journeys. Results from a recent study showed that, in its first year, NHS Direct halted the trend towards an increase in the use of GP co-ops.<sup>34</sup> The same study did not detect any measurable net change in activity at local A&E and ambulance services. However, a pilot scheme is planned in which some non-urgent (category C) ambulance calls will be transferred to NHS Direct. If successful, this could take some pressure off ambulance and A&E services.

A set of simple hypothetical scenarios was developed and included only available evidence on the potential impact of NHS Direct on other immediate care services and the consequent cost implications for the period March 1999 to March 2001. This is the two year period immediately following that studied by Munro *et al.*<sup>34</sup> Two years was thought to be the maximum time period for which realistic forecasts could be made: that is, within this time the probability of major service changes within the NHS is relatively small.

The sensitivity and threshold analysis used raw data from the study by Munro *et al.*<sup>34</sup> The routine activity data in that study (GP co-op contacts, emergency ambulance journeys, A&E attendances and NHS Direct calls) relate only to the populations covered at the three first wave sites when they became operational (a total of 1.3 million people). It should be noted however, that the estimates of NHS Direct average costs were calculated using total populations covered at each site.

#### 8.2.4 Threshold analysis

The second part of the analysis here attempts to answer the question: "What reductions in demand for other immediate care services would have to occur in order to offset the costs of providing NHS Direct?" It should be emphasised at this point, however, that reducing unnecessary demand on other NHS services is only one objective of NHS Direct, the main purpose of the service being to provide easy, fast advice and information about health, illness and the NHS.

It is important to note that any net change in demand may be the result of two opposite effects of NHS Direct: first, it may advise people to self-care who would otherwise have contacted a service; and second, it may refer people to the service who otherwise would not have used it.

It is possible that NHS Direct could have an independent impact on A&E and GP co-op services because of its use mainly as an out-of-hours service. However, currently there would appear to be little further scope for reducing emergency ambulance journeys. In addition to the hypothetical reductions in demand for services, as described in the sensitivity analysis, threshold analysis explores how much further

demand for A&E and GP co-op services would have to fall in order for cost savings to exactly equal the costs of providing NHS Direct.

### **8.3 Results**

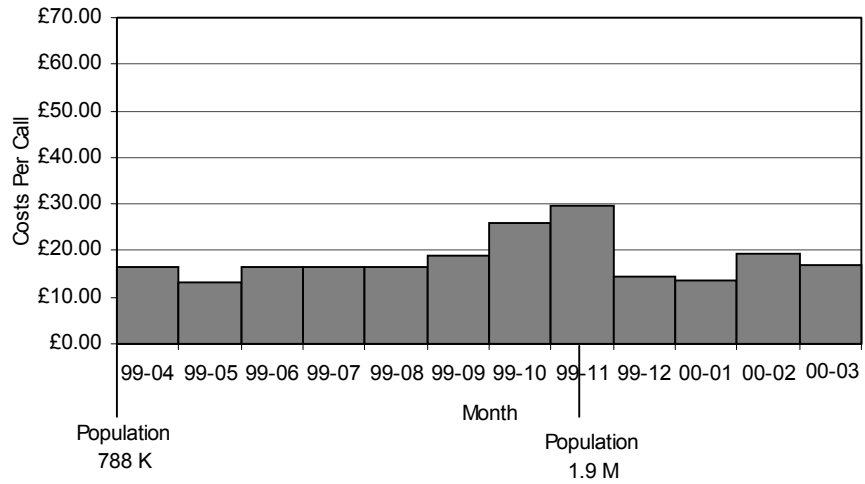
#### **8.3.1 Estimated mean cost per contact**

The estimated three-month-average cost per call for the period January to March 2000 was £13.16, £15.63 and £16.54 for the North East, Thames Valley & Northamptonshire, and Lancashire, respectively. These figures are likely to be closer to the eventual true long term average cost than an estimate taken at the beginning of the period.

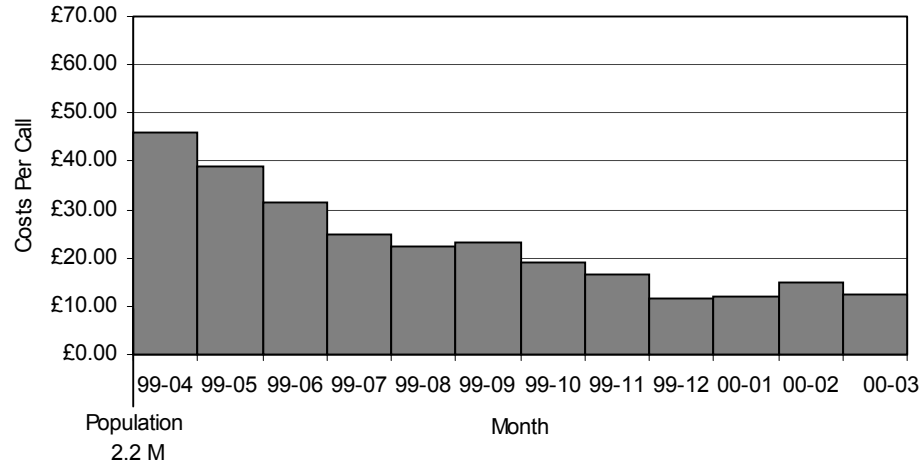
Average costs per call over a year are graphed below for each of the three NHS Direct sites for the period April 1999 to March 2000. For two of the three sites the average cost per call fell steadily over the 12 month period studied. NHS Direct North East (Figure 8-2) was already covering a population of 2.2 million by April 1999, while Thames Valley & Northamptonshire (Figure 8-3) increased its coverage to 1.7 million in July 1999. Clearly, for these two sites substantial staff costs were incurred in the months preceding these large increases in population size in order to cope with anticipated increases in call volumes. This would explain why both these sites appear to be experiencing economies of scale: that is, average costs are decreasing as output rises. At Lancashire (Figure 8-1), on the other hand, it was not until November 1999 that the population covered by NHS Direct more than doubled and in preparation for this change total costs rose sharply in the two months beforehand. If Lancashire follows a similar pattern to the other two first wave sites it may be several months before it experiences economies of scale.

Real economies of scale are to be expected as NHS Direct develops, for two reasons. First, as call volumes increase call rates per hour become more predictable and proportionately less spare capacity is needed to cope with the unevenness in demand; and second, the introduction of networking between sites creates a "virtual call centre" in which calls may be diverted from busy to less busy sites. Again, this has the effect of making overall demand more predictable.

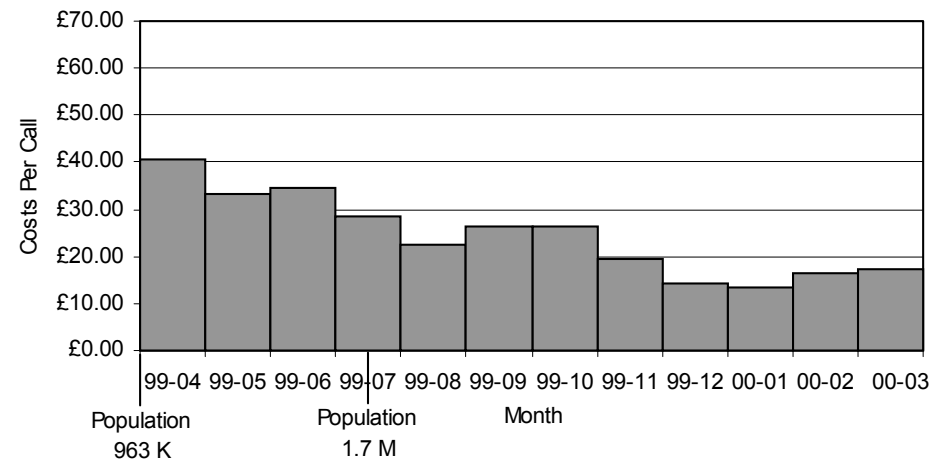
**Figure 8-1: Total costs per logged call, Lancashire**



**Figure 8-2: Total costs per logged call, North East**



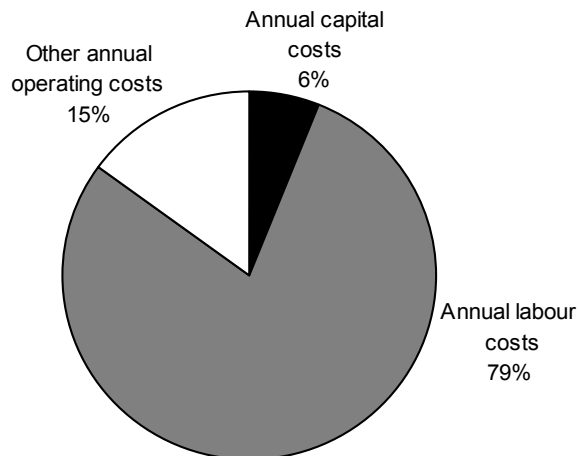
**Figure 8-3: Total costs per logged call, Thames Valley & Northamptonshire**



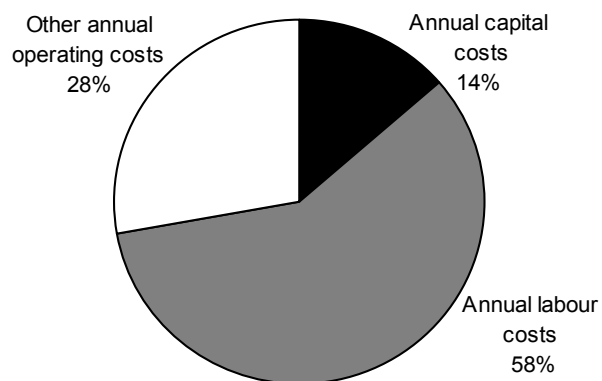
The figures below show that labour costs made up the greatest proportion of total costs over the period March 1999 to April 2000 for all sites, although this varied from

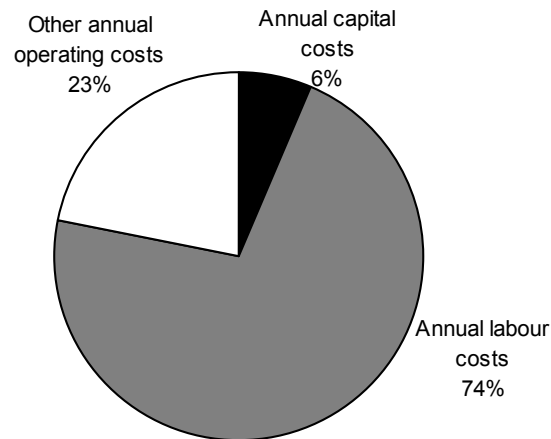
58% at NHS Direct North East to 79% in Lancashire. In NHS Direct North East annual capital costs made up 14% of total costs compared to 6% in the other two sites. This is because the North East spent substantially more on IT infrastructure than the other two sites. The introduction of the new NHS Clinical Assessment System will, of course, bring a degree of standardisation to the way software is paid for, as well as to the triage process.

**Figure 8-4: Breakdown of total costs, Lancashire**

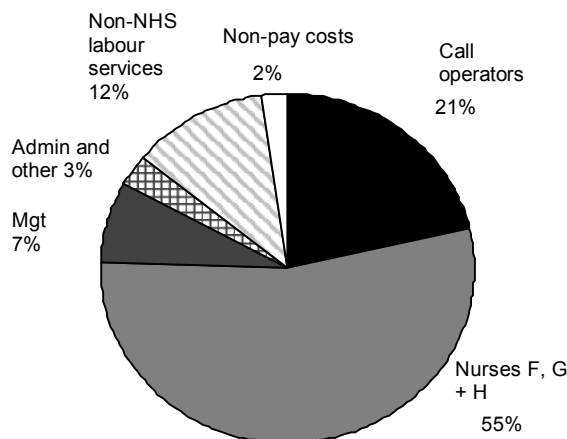


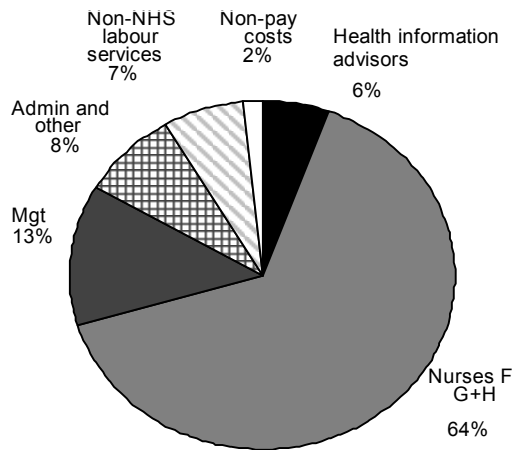
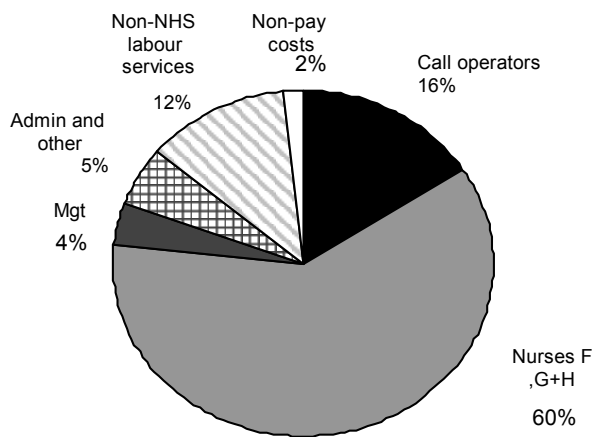
**Figure 8-5: Breakdown of total costs, North East**



**Figure 8-6: Breakdown of total costs, Thames Valley & Northamptonshire**

As the charts below show, most labour resources in each of the sites comprise nursing staff. In Lancashire 55% of total labour costs are nursing costs, which is the lowest of the three sites but call handlers make up a higher percentage of resources than in the other two sites. In Lancashire 21% of labour resources are dedicated call handlers. In Thames Valley & Northamptonshire the figure is 16% and in NHS Direct North East nurses answer all incoming calls, for the period examined in this cost analysis. Consequently, in the latter site nursing staff make up the biggest labour cost element (64%). Although it appears that more management resources are employed in NHS Direct North East than the other two sites (13% compared to 7% in Lancashire and 4% in Thames Valley & Northamptonshire) some management resources are included under the category Non-NHS Direct labour. All sites purchased specialist labour time, including management, from other NHS organisations such as the local ambulance service or hospital trusts, as well as from private agencies. Examples in the category of Non-NHS Direct labour include information, finance, personnel and typing staff.

**Figure 8-7: Breakdown of labour costs, Lancashire**

**Figure 8-8: Breakdown of labour costs, North East****Figure 8-9: Breakdown of labour costs, Thames Valley & Northamptonshire**

### 8.3.2 Sensitivity and threshold analysis

The potential cost implications of NHS Direct for the health service are explored in the scenarios listed in Table 8-2. The analysis quantifies the difference in immediate care costs (activity x unit costs) between the period just before the establishment of NHS Direct and two years later. GP co-op costs per contact are estimated to be £14.44 for telephone advice, £28.89 for an attendance at a primary care treatment centre and £54.89 for a home visit.<sup>35</sup> The average cost of NHS Direct is assumed to be constant at £15.11. The national average cost of an emergency ambulance journey is estimated to be £141.54,<sup>36</sup> and the cost of an A&E attendance is £64.96.<sup>35</sup> (Details of immediate care cost estimates and sources are given in an appendix to this chapter).

### 8.3.2.1 Scenario 1

In the first hypothetical scenario the monthly trend in use of GP co-ops, of -0.8%, as seen in the year after NHS Direct was established, continues for two more years and without NHS Direct the trend would have been +2%, as it was in the year before NHS Direct was established.<sup>34</sup> The trend in use of NHS Direct of 6.9% per month continues for two more years. The total costs of providing NHS Direct are £6.17m but the savings from a reduction in demand for GP co-op services are £0.95m: that is, 15% of the costs of providing NHS Direct.

### 8.3.2.2 Scenario 2

In addition to the GP co-op changes described above, non-urgent 999 calls are transferred to NHS Direct in the second scenario. This would succeed in reducing total emergency ambulance journeys by a maximum of 5%,<sup>37</sup> and this in turn is assumed to translate into an equivalent number of avoided A&E contacts. Given the relatively high costs of emergency ambulance journeys and A&E attendances the savings in this scenario come to 55% of the costs of providing NHS Direct.

### 8.3.2.3 Scenario 3

This scenario explores the consequences for the health service if average costs of NHS Direct continue to fall. Currently, average costs appear to be decreasing as output rises in two of the three sites. If this continues it may well be several more years before a steady state has been achieved, and true average costs per call can be estimated. We have also argued above that economies of scale will be realisable from the introduction of networking between sites.

Because of anticipated growth in population coverage and demand, each site will already have factored in a certain amount of growth into current service configurations (e.g. bigger premises, more computers or additional staff). One way to model these changes is to reduce costs accordingly, or increase call volumes. Estimates of average NHS Direct costs per call were made for the six months beyond the study period by assuming that each of the sites would be able to handle all projected call volumes without concomitant increases in total costs.<sup>38</sup> The projected costs from the three sites were averaged and the resultant average cost figure of £11.10 was included in the sensitivity analysis. If the average cost per call fell to this level cost savings from reductions in demand for other immediate care services as described in scenarios 1 and 2 would be 75% of the costs of providing NHS Direct (scenario 3a).

It is possible that after the introduction of the new NHS Clinical Assessment System call durations might fall from the current average of 14 minutes to about 6 minutes. To explore how this might affect the cost per call, variable and semi-fixed costs were reduced by half. Variable costs are those that change as output changes. An example

of such costs in NHS Direct would be software licence charges that are usually based on the number of users. Fixed costs are those that do not vary with output levels and would include such things as the rental cost of a building.

Nursing staff costs are treated as semi-fixed costs, since labour contracts limit the rate at which this economic resource can be adjusted. The effect of reducing variable and semi-fixed costs by 50 per cent would be to reduce the average cost per call, over all three sites, to £9.92. If the average cost per call fell to this level, cost savings from reductions in demand for other immediate care services, as described in scenarios 1 and 2, would amount to 84 per cent of the costs of providing NHS Direct (scenario 3b).

#### *8.3.2.4 Scenario 4 and 5*

An average cost of £60.69 was chosen for attaching costs to A&E contacts in scenarios 1 to 3. Given the statistical uncertainty around the average cost of an A&E attendance, sensitivity analysis included the use of upper and lower 95% confidence limits from the Sheffield sample distribution of A&E costs to define high (£77.39) and low (£43.99) estimates. The results in Table 8-2 show that if NHS Direct had an impact on demand for A&E and ambulance services as described in scenarios 1 and 2, savings could range from 51% to 57% of the costs of providing NHS Direct depending on the A&E costs chosen for the analysis. If attendances at A&E are avoided as a result of transferring category C calls to NHS Direct the nature of the complaint is likely to be minor and so the lower A&E cost estimate would be a more appropriate choice.

#### *8.3.2.5 Scenarios 6 and 7*

Given the statistical uncertainty around the average cost of an emergency ambulance journey, sensitivity analysis included the use of upper and lower 95% confidence limits from the national distribution of ambulance journey costs to define high (£152.80) and low (£130.29) estimates in order to explore the impact on the results of using extreme values. Instead of savings of 55% as seen in scenario 2, savings would range from 53% to 57% of the costs of providing NHS Direct depending on the average emergency ambulance journey costs chosen.

#### *8.3.2.6 Scenarios 8 and 9*

In order to completely offset the costs of providing NHS Direct, demand for other immediate care services, other than those described in the sensitivity analysis (scenario 2), would have to decrease further. In the sensitivity analysis the second hypothetical scenario shows that specific reductions in demand for GP co-op, emergency ambulance, and A&E services would result in cost savings that would sum to 55% of the cost of providing NHS Direct. Independently of this, A&E attendances would have to fall by a further, cumulative 0.55% per month in order to equalise the

costs of providing, and the cost savings from, NHS Direct (Table 8-2, scenario 8). GP co-op contacts would have to reduce by a further 3.6% per month, cumulatively, in order to achieve the same cost savings (Table 8-2, scenario 9).

An alternative scenario (not shown below) is to model a one-off fall in A&E attendances, rather than a cumulative monthly fall. In such a scenario, a one-off reduction in attendances of 6.5% would be required to entirely offset the cost of NHS Direct.

**Table 8-2: Results of sensitivity and threshold analysis for a population of 1.3 million**

Scenario description	Costs of					Change from baseline	Saving (as % of NHSD costs)
	NHS Direct	GP co-op	Ambulance services	A&E	All immediate care		
<i>Baseline costs</i>	-	9.20	33.46	43.20	85.86	-	-
1. GP co-op changes	6.17	8.25	33.46	43.20	91.08	5.22	15
2. Transfer of category C amb. service calls	6.17	8.25	31.79	42.43	88.64	2.78	55
3a. NHS Direct contact = £11.10	4.53	8.25	31.79	42.43	87.00	1.14	75
3a. NHS Direct contact = £9.92	4.05	8.25	31.79	42.43	86.52	0.66	84
4. Change in A&E cost: low estimate = £43.99	6.17	8.25	31.79	28.74	74.94	3.02	51
5. Change in A&E cost: high estimate = £77.39	6.17	8.25	31.79	50.55	96.75	2.63	57
6. Change in amb. journey cost: £130.29	6.17	8.25	29.26	42.43	86.11	2.91	53
7. Change in amb. journey cost: £152.80	6.17	8.25	34.32	42.43	91.16	2.64	57
8. A&E attendances fall by further 0.59% per month (cumulative)	6.17	8.25	31.79	39.64	85.84	-0.02	100
9. GP co-op contacts fall by further 3.9% per month (cumulative)	6.17	5.44	31.79	42.43	85.83	-0.03	100

*All costs shown are in £ millions at 1999/2000 prices*

#### **8.4 Discussion**

The average cost of a call to NHS Direct between January and March 2000 (£15.11) was higher than one published cost estimate of £8.00 per call.<sup>39</sup> Even in the long run, if sites are experiencing economies of scale, an optimistic estimate of the cost per call is still £3 higher at £11.10.

Despite a lack of comparative cost data for other immediate care services it is interesting to note that in the results presented here, the average cost of an NHS Direct call (£15.11) is similar to the average cost of telephone advice in at least one GP co-operative (£14.44). However, a recent study of seven GP co-operatives

estimated that there was a six-fold variation in the operating costs per 1000 patients covered.<sup>40</sup> Although nursing staff costs are likely to be lower than general practitioner staff costs, current nurse consultation times (average 14 minutes<sup>41</sup>) in NHS Direct are approximately nine minutes longer than a GP co-op telephone consultation (average 5 minutes<sup>42</sup>). We have estimated that if NHS Direct call durations are reduced to a similar time (about 6 minutes) with the introduction of the NHS Clinical Assessment System, then NHS Direct costs per call will fall to about £10. However, we don't know whether any benefits of NHS Direct, such as reducing the demand on GP co-operatives, are related to call duration and it may be unwise to assume that existing effects would continue if there were very substantial changes in the nature or duration of calls. This will be an important issue for future research.

Estimates of NHS Direct costs-per-call do not take into account follow-up health care after the first contact. There is concern that NHS Direct might have the effect of increasing demand for GP surgery, GP co-op, or A&E services. That is, without NHS Direct individuals might have provided self-care whereas after contacting NHS Direct they might be advised to contact their GP or attend an A&E department. On the other hand, contact with NHS Direct might reduce the demand for some medical care. That is, an individual who might otherwise have contacted his/her GP might not feel the need to do so after receiving advice on self care from NHS Direct. Evidence from the first year following the introduction of NHS Direct demonstrated no measurable net effect on ambulance and A&E services, but some reduction in the growth of demand for out-of-hours general practice.<sup>34</sup> In the meantime further research using economic modelling techniques has commenced at the Health Care Research Unit at the University of Southampton to explore the range of possible cost consequences of NHS Direct.

It would be misleading to make direct cost-per-call comparisons between the sites based on the analysis presented here. Each site is still in a period of transition and changes are occurring at different times at the three sites. Furthermore, each of the sites is organised differently. For example, NHS Direct North East is the only first wave site that has become integrated with a local GP co-op. This has had the effect of increasing demand for the service when GP co-op calls were first accepted in July 1999. At the same time it is in the nature of the service that total costs comprise a very high fixed-cost element relative to the variable-cost element. This means that when demand increases it is more likely to have a strong negative effect on average costs.

A true economic cost-effectiveness analysis would measure costs *and* health outcomes and compare them to alternative interventions, whereas the analysis in this chapter focuses mainly on the costs of NHS Direct. An indication of the range of benefits to callers and patients, such as reassurance and information, can be found in the caller survey reported in our first interim report on NHS Direct.<sup>4</sup>

Currently, very uncertain evidence is available on the impact of NHS Direct on other immediate care services. The simple sensitivity and threshold analysis presented here, therefore, is meant to show what impact changes to patterns of demand for immediate care services *could* have on health service costs. There is an assumption in this analysis that unused resources would be redeployed efficiently within the health service. Often this is not a realistic assumption. If NHS Direct were responsible for a reduction in demand for other services it might only be in the longer term that savings would be realised. For example, if NHS Direct was successful in reducing the number of emergency ambulance journeys, it is unlikely that ambulances would be decommissioned. It is more likely that the impact would be felt in perhaps five years time when the projected number of new ambulances and crews would be revised downward. Alternatively, the impact might be seen in the performance of the NHS: for example, the consequences of reduced demand might be improved ambulance response times for emergency calls and/or shorter A&E waiting times.

### **8.5 Conclusions**

The estimated average cost per call for NHS Direct has been falling steadily at two of the three first wave sites over the period April 1999 to March 2000. Costs per call are broadly similar at each of the three sites (£13.16, £15.63 and £16.54) despite differences in each site's location and organisation. Each of the sites is in a period of transition and long run average costs would best be measured again in two or three years if the services are experiencing a steady state. Using available evidence on the possible impact of NHS Direct on other immediate care services, sensitivity analysis shows that the potential cost savings in the long term could sum to 75% of the costs of providing NHS Direct. Further reductions in demand for A&E or GP co-op services would be required before the costs of providing NHS Direct would be completely offset. More evidence on the impact of NHS Direct on other parts of the health service is required before a full analysis of the cost consequences of NHS Direct can be performed.

### **8.6 Appendix A: Calculation of equivalent annual cost**

For each capital outlay it is necessary to find the annual sum  $E$  which over a period of  $n$  years, at an interest rate of  $r$  will be equivalent to the capital outlay  $K$ . This is expressed by the following formula:

$$K = \frac{E_1}{(1+r)} + \frac{E}{(1+r)^2} + \dots + \frac{E}{(1+r)^n}$$

The capital cost is divided by an annuity factor which is based on  $n$  and  $r$  and which can be taken from tables.<sup>33</sup> For example, if the purchase price of a building is £60,000, the interest rate is 6% and the expected lifetime of the building is 15 years the annuity factor would be 9.1772. The equivalent annual cost therefore would be £6538 (£60,000/9.1772).

When calculating equivalent annual costs for this analysis an interest rate of 6% was used. Expected life of resources were assumed to be as follows:

- Buildings - 15 years
- Computer hardware - 5 years
- Communications equipment - 5 years
- Staff training - 5 years

### **8.7 Appendix B: Sensitivity and threshold analysis cost estimates**

For the sensitivity and threshold analyses reported above, a range of reported cost estimates are available, as Table 8-3 shows. We chose particular estimates for this study, as follows:

For *GP co-op contacts*, the estimate derived in Sheffield was chosen.<sup>35</sup> The average cost per contact in this study was estimated to be £22.66, but by weighting this figure by the average time taken for each type of consultation (telephone advice, attendance at a primary care treatment centre and home visit) it was possible to calculate a unit cost for each type of contact as shown in Table 8-3.

For *emergency ambulance journeys*, the national average cost (£125.17) was chosen because ambulance service activity data were collected from three geographically different sites. High and low estimates were found from the 95% confidence limits within the sample data. See table below for high and low estimates.

For *A&E attendances*, a cost of £60.69 was chosen. Like the activity data this cost figure refers specifically to first attendances. In addition, it is derived from a “bottom-

up” costing exercise that is more closely related to the concept of opportunity cost than the national average (£53.96) which is a “top-down” accounting cost estimate. High and low estimates were found from the 95% confidence limits within the sample data. See table below for high and low estimates.

All of the above costs were adjusted to 1999/00 prices using the Hospital and Community Health Services (HCHS) pay and price inflation index. The adjusted costs are shown in Table 8-4.

**Table 8-3: Available UK cost estimates for immediate care**

Immediate care service	Cost per contact (£)	Year	Source
GP co-operative contact	13.13, 26.26, 49.90*	1996/97	Evaluation of GP co-operative in Sheffield <sup>35</sup>
	27.12	1995	Buckinghamshire survey of out of hours services <sup>43</sup>
Emergency ambulance journeys	118.80	1995	Buckinghamshire survey of out of hours services <sup>43</sup>
	125.17	1995/96	NHS Executive letter re benchmarking <sup>36</sup>
A&E			
first attendances	53.96	1998/99	Trust financial returns (national average) <sup>44</sup>
all contacts	19.78	1995	Buckinghamshire survey of out of hours services <sup>43</sup>
primary care patients	11.70, 17.97, 19.30**	1990/91	Treating primary care patients in A&E (not admitted) <sup>45</sup>
primary care patients	32.30, 44.68, 58.25**	1990/91	Treating primary care patients in A&E (admitted) <sup>45</sup>
first attendances	60.69	1996/97	Evaluation of GP co-operative in Sheffield <sup>35</sup>
NHS Direct	13.16, 16.54, 17.15†	1999/00	Cost analysis of NHS Direct at three first wave sites

\*Tel advice, primary care treatment centre, home visit respectively

\*\*GP, registrar, senior house officer respectively

† North East, Lancashire, and Thames Valley and Northamptonshire, respectively

**Table 8-4: Cost estimates used in the sensitivity and threshold analyses**

Service	Cost estimates adjusted to 1999/2000 prices (£)
GP co-operative contact	
telephone advice	14.44
attendance at primary care treatment centre	28.89
home visit	54.89
Emergency ambulance journey	Average = 141.54, Low = 130.29, High = 152.80
A&E first attendance	Average = 64.96, low = 43.99, high = 77.39
NHS Direct call	Average = 15.11, low = 11.10

## **9. NHS DIRECT IN PRINCIPLE, PRACTICE AND PROGRESS: VIEWS OF STAKEHOLDERS**

### **9.1 Introduction**

The introduction of any new technology or service to the NHS inevitably has an impact on many different groups and services. While quantitative research methods can help to measure some dimensions of this impact – such as the extent to which the new technology improves health, or affects demand for other services – qualitative research methods are required to identify less tangible effects and suggest possible explanations for the success or failure of the technology. An essential part of the evaluation of the first wave NHS Direct sites has therefore been to interview stakeholders – people in organisations which might be affected by NHS Direct – to determine their views of the new service.

### **9.2 Methods**

In this part of the evaluation we undertook applied policy qualitative research, grounded in the views of those potentially affected by the introduction of NHS Direct.<sup>46</sup> There are numerous agencies and groups which might be affected by the service, including accident and emergency departments, general practices (as providers of both out-of-hours and in-hours services), health authorities, ambulance services, acute and community trusts, community pharmacists, dentists, community health councils, health information services, other helplines, the NHS Executive, the nursing profession, social services, users and potential users of the service, providers of the service, and others. Given this diversity, we could not attempt to obtain the views of every group, but rather a range of views from a selection of these groups.

#### **9.2.1 Selection of stakeholders**

We identified local stakeholders through the NHS Direct stakeholder or advisory boards in each of three sites. This approach meant that we included stakeholders who were closely involved in the development of NHS Direct and who could offer a knowledgeable view of the service. We obtained lists of group membership from each site and selected one stakeholder from each of the following agencies for each site: accident and emergency departments, general practice out-of-hours co-operatives, general practices, health authorities, hospitals, NHS Direct providers. In addition, we selected one stakeholder from any site, for the following agencies: community health councils, social services, pharmacy services, and dental services. The three first wave NHS Direct sites are run by ambulance services and at the time of this study contracted with health information services for the provision of health information. Members of these agencies were not included separately from NHS Direct providers.

Users and potential users of the service were not included in this study since their views have been reported in previous work.<sup>20 47</sup>

In all, we invited 23 people to be interviewed of whom 22 agreed; one person could not be contacted, rather than refused the invitation. One interview included a nursing colleague of a general practitioner who had been invited for interview, so that a total of 23 people were interviewed in 22 interviews. Semi-structured face-to-face interviews were undertaken in May and June 1999, approximately 15 months after the launch of the three first wave sites. When face-to-face interviews were not possible, telephone interviews were undertaken. Sixteen interviews were undertaken face-to-face and six by telephone. The sample included four accident and emergency consultants, three GPs managing out-of-hours co-operatives, a further two GPs, three health authority managers, two hospital managers, four NHS Direct providers and four people from other groups (dental, pharmacy, social services, community health council). Four interviewees had nursing backgrounds.

### 9.2.2 The interviews

We developed different interview schedules for agencies and for providers of NHS Direct, as shown in an appendix to this chapter. At the time of the interviews the three first wave sites had expanded to cover larger populations and provide wider services. During the interviews we focused on the first wave service, which included health advice and health information provided by nurses. We gained consent for participation by letter and follow-up telephone calls. Interviews were undertaken by one researcher (AOC), and were on average 35 minutes in length. They took place in the interviewee's workplace or occasionally in their home, and each was tape recorded and transcribed verbatim.

### 9.2.3 Analysis

Framework analysis was undertaken.<sup>46</sup> This involved reading and summarising the transcripts, identifying a preliminary list of emerging themes, and coding each transcript according to the thematic scheme. Further reading of the transcripts helped to identify sub-themes within each theme. Two researchers (JFM and AOC) discussed the development of the themes and sub-themes during this process.

## 9.3 Key findings

### 9.3.1 NHS Direct in principle: opportunities and threats

The majority of stakeholders interviewed felt that the *idea* of NHS Direct was good and that the new service presented important opportunities for health service users, nurses and the NHS itself. However, they also felt that there were potential threats to GPs and to the health service from NHS Direct.

### 9.3.1.1 *The opportunity of a more accessible health service – or the threat of raising consumers' expectations?*

The expectation that NHS Direct would improve access to health care was seen as both an enormous opportunity and an enormous threat. The opportunities for health care users were that NHS Direct could help people with the uncertainty of whether to contact a service and the confusion of which service to contact; could be particularly useful when other NHS services were 'out of hours'; might offer a route to advice rather than treatment; and could meet a previously unmet need for reassurance. Some stakeholders took this further by saying that NHS Direct offered the possibility of a "user-friendly" health service, with easier, more convenient access through a telephone service available 24 hours a day.

*The philosophy behind it is I think very sound, and is a much-needed one. At the moment there is nowhere really that people can easily access advice, health advice other than talking to their GPs or actually turning up in the hospital. We also have the additional problem that a large number of people phone us who simply need advice, but these people will still take up time which we could be using more effectively, dealing with more urgent problems. So it would – if it's implemented appropriately – be a good idea. **A&E 1***

*People lead very busy complicated lives, and it does not fit into Monday 9 -5 you know...people want to be able to ring up at night for certain things and that is the way modern life goes. If we want to be a modern health service or we want to suppress demand and dampen demand, well – I don't think we can. I think we have got to meet that demand, but you find effective ways of doing it. **Health Authority 2***

However, this idea of improving access for users was seen as a threat by GPs who saw NHS Direct, and other recent initiatives like walk-in centres, as raising the expectations of the public for all NHS services, including general practice.

*It is a political agenda, the government wants to increase...consumerism...open general practice like a hole in the wall... open the tap and get general practice. This is not the way to do it. **GP 2***

*If it goes the wrong way, I think it can lead to an increased demand of all services all round, because what you're doing is you're, its giving out a message: the new NHS is as accessible as it can be. Which is, NHS Direct is part of that strand, looking at surgeries opening for longer hours as part of that strand, having the walk in centres at the NHS Direct type places is part of that strand as well. If you're opening up a health service and saying this is a much more accessible health service, you will be able to use this. But we are not balancing it by saying but use it carefully and properly, which we are not doing, we're just saying here it is, its open 24 hours a day, use any part you think you can. Demand will escalate, because that's what you are going to do. **GP 1***

### 9.3.1.2 *The opportunity of empowering users in self care – or the threat of creating a dependent population?*

A further opportunity was seen for health service users: that NHS Direct had the potential to “empower” users to undertake self care – although another possible outcome of the service would be to encourage the creation of people more and more dependent on telephone advice.

*Well what I'm told is what I said, is that they would, they will, not only divert minor problems from services but also lead eventually to an increase in self reliance and self care, that's what I would really like to see it doing, but whether its going to achieve that or whether its just another helpline that people just use it, and, and at the worst extreme of that, whether it actually fosters yet more of the feeling that there is somebody else out there who should be looking after something for you, rather than yourself. Can you make these decisions yourself or do you always have to phone NHS Direct to tell you to do it?*

**GP 1**

*But I think we need to get people into a culture where they don't always phone NHS Direct for everything, and NHS Direct should be saying, well this is the answer that you could have got from X. Because otherwise people just get too reliant on one number.*

**Other 4**

### 9.3.1.3 *An opportunity for nurses – or a threat to doctors' roles?*

Those stakeholders with nursing backgrounds saw NHS Direct as a new opportunity for nurses. Even so, they were aware of some potential threats to skills retention and job satisfaction for nurses. Many suggested rotating NHS Direct nurses through other clinical posts in the NHS as a possible solution.

*Professionally for nursing, it is a wonderful opportunity to take health care forward in a very different type of environment, so that's an opportunity. NHS D 3*

*We had always envisaged there was a need for rotation, for two reasons: partly to keep them up to date with other skills so they didn't lose their sort of nursing face to face contact stuff; and to give them some relief from being at the call centre which I think is a particular sort of way of behaving – and most nurses are trained to do things hands on with patients in a sense; but also to allow for a cascade of the knowledge and skills, and a lot of the techniques they pick up by using those algorithms can obviously apply in other situations... and also one of the concerns that trusts have – more particularly A&E departments who have nurse practitioners in minor treatment services – that we were raiding their staff and poaching staff into this service and they were all being denuded.*

**Hospital 1**

Some stakeholders saw NHS Direct as a potential threat to the roles of other services – for example, as a threat to GPs' role as gatekeepers for the NHS, as well as their role as demand managers for their own services. Additionally, NHS Direct was seen as a threat to one local A&E department, which was under threat of closure, and did not welcome the potential for reduction in workload.

*It's got tremendous potential but I think it worries a lot of practitioners that it's a sort of 'big brother' response in some ways as well, that threatens various other health care providers, and is trying to sort of take over their role...it's really about how far you then take it. If you get into 'this is how you get your appointment at your GPs surgery' stage, as a gatekeeper, I think this raises a whole set of other issues about confidence and control and who's doing what which would be much more threatening than the telephone advice. **Hospital 1***

#### 9.3.1.4 *The opportunity for a reduction in demand – or the threat of increased demand for other services?*

Some stakeholders felt that NHS Direct could help health services by taking away unnecessary demand, offering another referral option for services, helping to improve current services, and making contacts with services more appropriate. Others felt that either NHS Direct would have no effect on other services or that it would increase demand for their services in two ways: first, by raising expectations (as discussed earlier); and second, by referring patients inappropriately. In particular, GPs were concerned about this latter issue.

*Yes, a lot of the calls to the out-of-hours service are really for advice, not needing actually medical attention, and if they are assessed first by NHS Direct, that would negate for a doctor to triage the calls. **GP co-op 2***

*It shouldn't be about increasing casualty attendances, it shouldn't be about increasing GP attendances, its something to do with providing a complementary system, but not one that is then producing a whole new load of work for the other services. But I think it's quite a difficult, I think it's an incredibly difficult thing to do (telephone triage), because I do it, and I know it's incredibly difficult to do, and I always have a fall back, I just say come and see me, and so I know how hard it is to make decisions on the telephone. **GP 1***

Stakeholders were aware that they had little data available to allow them to comment on the effect which NHS Direct was actually having on services. Even where they had data, some were aware of the difficulties of attributing changes to NHS Direct. However, there were some patterns in the perceptions held: that NHS Direct had reduced, or could reduce, the numbers of telephone calls to A&E departments; that NHS Direct had had little or no impact on *attendances* to A&E departments, partly because the activity levels of NHS Direct had so far been too small to have an effect; that GPs felt that there had been no impact on day-time general practice in either direction; that NHS Direct may have impacted on GP co-operative services, either to increase or decrease demand; and that there was a possibility of increasing the use of emergency (999) ambulances and this needed to be monitored and audited to ensure appropriate use. Some of these perceptions have been confirmed by quantitative research.<sup>34</sup>

### 9.3.1.5 *The threat of duplication of services*

There was an additional concern, particularly from health authorities, about possible duplication in the system, particularly with GP out-of-hours services.

*We were very concerned about the overlaps with other existing services, health information service, the GP out-of-hours schemes, the co-operatives, the various initiatives that had been started locally within (this area), to address the sorts of GP co-ordination concerns. **Health authority 1***

Stakeholders wanted services to work together, with a particular emphasis on integration between NHS Direct and other services. In particular, GPs wanted NHS Direct to be complementary to primary care, rather than a substitute.

*I do think there is tremendous potential to be integrated with primary care – and I do think there's tremendous potential to be integrated with primary care to deal with urgent enquiries. **NHSD 1***

*It should be seen and encouraged to be a service as an additional service to general practice, not as an alternative...they have got to say that this is an alternative which patients might like to use, but that does not mean that they can't ring for our help and advice. **GP 2***

### 9.3.1.6 *The threat of competition for finite resources – money and staff*

As well as possibly threatening other services by increasing demand, NHS Direct was seen as a potential threat to two finite resources within the NHS – money and staff. A number of stakeholders expressed concerns about how costly the service seemed to them. They were worried about the long-term funding of the service and the possibility that this would involve withdrawing funds from other services. In addition, they were aware of competing demands for nurses and had concerns about the effect of removing nurses from other parts of the NHS.

*...as long as the funding is from a separate amount and it's ring-fenced and it's not coming out of primary care, because there's no doubt it is an inefficient service in terms of cost per patient contact. **GP co-op 2***

*We have lost a few senior nurses – and so have all other hospitals in the area – because NHS Direct offers quite a high grade post to nurses and areas that are most vulnerable to losing experienced staff apart from A&E are all acute specialities like general medicine and surgery and orthopaedics and so on. So we are quite concerned now. Is NHS Direct maybe robbing Peter to pay Paul? **A&E 2***

### 9.3.1.7 *The threat to evidence-based care*

Given that the new service was perceived as costly, and potentially could threaten other services' funding and workload, stakeholders stressed the importance of rigorous evaluation. They felt that NHS Direct had been implemented in the absence

of any existing evidence about its value for money, despite the rhetoric of evidence-based health care. There was concern, disappointment and even anger that a decision had been taken to implement the service nationally, without first being fully evaluated as a pilot. Stakeholders expressed this concern whether or not they themselves saw NHS Direct as an opportunity or a threat.

*It's going national, is the intent. If you accept my comments about duplication and redundancy...it is untested. A lot of money, and it's not evidence-based. Hospital 2*

*My only concern is that it seems to have been rushed into being nationwide even before the evaluation of the first few waves have been completed and I hope that that doesn't mean that it falls down and therefore loses confidence of people like GPs, pharmacists, whoever. Health authority 3*

### 9.3.2 NHS Direct in practice: relationships and policy dilemmas

Building relationships between NHS Direct and external agencies, and between NHS Direct and the ambulance services which initially hosted the new service, was a key task for NHS Direct in its first year. This involved communicating with external agencies and working closely with them to engender confidence in NHS Direct's clinical decision-making. The experience of the first year of NHS Direct also threw up some difficult policy dilemmas, such as: whether NHS Direct should be primarily directed by national or local concerns; issues around the relationship between the software and the nurse, and the cost and safety of the service; and the dilemmas resulting from the need to generate demand for NHS Direct, yet maintain the ability for the service to cope with the demand.

#### 9.3.2.1 *Communication with external agencies: good, bad and indifferent*

The majority of stakeholders felt that it was very important to be involved with NHS Direct, and particularly valued participating in the stakeholder group which existed in each of the three sites. They gave examples of good communication between NHS Direct and external agencies, and of building partnerships through working together in practice, for example on training issues.

*I would like NHS Direct to continue to keep general practitioners and emergency physicians and nurses on board with the ongoing development, and because whatever advice they give will actually affect us we would like to have as much ownership as possible of NHS Direct and its evolution and all the decisions made with its development.*

#### **A&E 1**

However, NHS Direct had also met with hostility, disappointment or indifference from some agencies. Some GPs felt "left out" of the development of NHS Direct nationally or locally, and had viewed it with hostility because of this. Other GPs had wanted to work with NHS Direct but were disappointed and angry about their experiences of

attempting to do this. A&E consultants were somewhat different: they were either enthusiastically involved with NHS Direct or indifferent to it.

*We had heated exchanges about being left out, how that was inappropriate...you can upset people on the way if there's not enough discussions. GP co-op 3*

Whether relationships had started off positively or negatively, it was generally the case that they improved over time due to the efforts of both the external agencies and NHS Direct. Time appeared to be a key factor for all parties to adapt to the new service as a part of the established health care system. However, although relationships had improved enormously, some people were still wary and not everyone was won over. One good relationship deteriorated and then recovered, highlighting the need for constant efforts to build and maintain relationships.

*Well, we on the board (of the GP co-operative) have been initially sceptical, but having worked with them towards a common purpose, proved our relationship, and hope to actually work together to triage the phone calls by the millennium...you know I think we have a good relationship with them.*

**Researcher:** *Is that true of GPs in general?*

*In this area? I would say that there's probably about a third are opposed, a third aren't bothered and a third are fairly positive about it. GP co-op 2*

### 9.3.2.2 Ways to gain clinical confidence

Stakeholders felt that it was important that both professionals and consumers had confidence in NHS Direct and recognised that this would take time to achieve. Professionals gained clinical confidence from a variety of sources: observing the service performing well, seeing it in operation first hand, reviewing the guidelines or algorithms, and participating in audits. Some stakeholders had concerns about the quality of the advice given, did not have confidence in the service or had lost confidence because they had not experienced these things. For example, for the two health professionals below, their level of confidence in NHS Direct seemed to be determined by whether or not they had seen it in action.

*I watched somebody work their way through it and I must say I was incredibly impressed at the way he did it. And I thought he did brilliantly well – and I mean you know, it was a child with a fever, and I thought at one point he was going to send in 'query meningitis'. But he worked all his way through it and came out in the end incredibly sensibly, and I thought that was absolutely great. GP 1*

*We are not yet confident that the advice system has been sufficiently tested to our satisfaction, so many of us in the profession have not actually seen the software that is being used and the training that is being given to the advisors. A&E 2*

The providers of NHS Direct talked about the audits they had undertaken, and how helpful they were in ensuring that appropriate referrals were made to other services. Although not explicitly articulated, these audits seemed to give the providers confidence in their service and offered a method of reassuring other services about the appropriateness of referrals to them or the opportunity to address inappropriate referrals.

*They say the patients we send down they feel are appropriate. We do regular audits and there have been very few cases that have been inappropriate – every time, its been somebody that we never recommended to go down in the first place. **NHSD 2***

### 9.3.2.3 *Being new in an established service*

No matter which organisation hosted NHS Direct, there were tensions caused by introducing a new – and radically different – service into an established organisation. Some tensions seemed to result from differences in service culture and philosophy, and different funding levels, and others from trying to meet NHS Direct priorities while working in an organisation with quite different priorities.

*You've got, you know, the [old organisation's] way of doing it and you don't want to upset people by doing it too differently, and then you've the national guidance which if you want to remain an accredited site you've got to find a line down the middle. It's hard and the speed makes it hard. **NHSD 2***

### 9.3.2.4 *A national or a local service?*

Stakeholders had views on whether NHS Direct should be driven by national policies or local demands. They wanted the service to be led by national standards with local flexibility, but there was recognition of the tension between these. Some felt that there was a lack of national guidance, leading to too much local interpretation. However, one stakeholder felt it was the other way round. Whatever the case, both aspects of the service were felt to be important.

*We're expanding to [a neighbouring area] and the stakeholders do not understand the national agenda. They're still diverting it to their own ways. This dilutes NHS Direct. They want local control.... we've got to get national coverage and standards and make decisions nationally. It needs national management and national direction. We need national standards with local bits to them. **A&E 4***

*The IT, the clinical systems, or structure or whatever, and there are some things that don't vary locally. There are a lot of local factors you need to build into some of these schemes. They need some flexibility but I think we need to be much clearer in a sense about what it's core business is, how far it is going to go – this is now the standard, the service, and this is kind of the national expectation – or whether there are still going to be local variations or whatever, there are advantages and disadvantages to both. **Hospital 1***

### 9.3.2.5 *Balancing software, nurses, time, cost and safety*

Stakeholders discussed the advantages and disadvantages of having computer decision support software, and of the different types of software support available. There was a tension between the safety apparently offered by such a system and the time consumed by using the software, which had cost implications (quite apart from the cost of the software itself). Issues also arose about the flexibility of the systems for nurses, with stakeholders recognising that there was a spectrum of support possible, from a strictly constrained system at one end to one relying mainly on the clinical judgement of the nurse at the other. This led to a debate about the level of nurse expertise required by NHS Direct, and further debate about whether the experience and clinical background of the nurse might affect the advice given.

*The algorithm system is, in my view, the safest way to do it. And that has a lot of sort of up front costs to doing it that way in terms, you can't just train somebody tomorrow to do it in one day. But I think it's worth the investment because of the return you get. But people will describe it to you as an expensive service if you are taking 10, 12 minutes to talk to someone to do something properly. So we have to make our minds up, I think, in a sense of what quality we want out of this system – is it a 'rapid response quick call and off the line' sort of stuff? And that's got implications for all sorts of cost and organisational structures. **Hospital 1***

*Lots of people – GPs – say that any idiot can go through those protocols, why do you need a trained nurse? I said hang on, they do use clinical judgement so you can't just have anybody doing those protocols. It's protocol driven so it's very safe, but perhaps more slight flexibility on those protocols, but then again that is going to take time, to hone those down and refine them, and I think it is irritating for clinicians because they're used to jumping fairly quickly to conclusions, but they have to go through the tree. **Health authority 2***

### 9.3.2.6 *Managing demand*

A small number of stakeholders were concerned about whether NHS Direct could cope with demand, and some had had experience of when it had not coped. The variability of demand was an issue, with peaks out-of-hours and during holiday periods. Some felt that the service would need more resources to cope with increasing demand.

*Patients couldn't get through, taking up to 40 minutes to get through, then being very resentful at having to go through a prolonged telephone consultation process...When I rang up NHS Direct to find out what was going on they admitted that there was a problem, that it was due to unforeseen sickness absences, it was due to a leaflet drop that had come from the centre that had actually doubled their workload over night, and also that they were relatively under-resourced to take on the commitments which they had undertaken...My own view of it is that they hadn't done their homework. They went in promising the earth to everybody, linking up with every agency they could possibly*

*think of, it was more like working off a wish list, starting off the top and working downwards. And no one paid any attention to operational matters. That's what went wrong. GP co-op 1*

Publicity was brought up as an issue by A&E consultants, health authority managers and providers of NHS Direct. They recognised its importance but felt that it had not been handled well so far, for a variety of reasons such as a fear of being swamped by demand and the difficulty of advertising in small areas. They were looking forward to national coverage of the service so that publicity could improve.

*There have been difficulties in targeting publicity to a relatively small proportion of your population. You know xxx out of your total population of [local area] has been a little bit problematic. As it gets bigger and bigger then the areas that you are publicising to get bigger and bigger and ultimately by next year nationally, to be able to you know, to advertise on the TV that this service is available, I think it's only then that we will hit the true potential of NHS Direct in terms of accessibility for the public, because it will be on the national TV. NHSD 3*

### 9.3.3 NHS Direct in progress

These interviews were undertaken in June 1999 and some of the future developments put forward by stakeholders at that time have already been piloted. Stakeholders wanted NHS Direct to expand the types of services it provided, to act as a facilitative route into the NHS, but to undertake new developments at a slower pace than before.

#### 9.3.3.1 *Increase the range of services offered*

Stakeholders wanted to make more of the triage and information services currently provided by NHS Direct. First, they felt that NHS Direct could triage for both out-of-hours and in-hours general practice and take low priority (Category C) calls from ambulance services, and that there was a need to promote the health information role of NHS Direct, as well as its nurse advice role.

*And then the next step is the category Cs, you know and that will, obviously have an impact on the 999...I mean, you know, the potential for NHS Direct to be triaging all calls into both A&E departments and into primary care services, not just out-of-hour callers, is immense because again out-of-hours, yes, you know, patients are more reluctant to call the GPs out-of-hours than they would be in-hours but similarly, you know, what number of patients are calling their GP in-hours and getting appointments they really didn't need to see their GP or go to their GP and are then referred to an A&E department? So again, from the patient's point of view, it's a telephone call, a routine visit to GP, then to an X-Ray department and then possibly to having a plaster on the leg, when this could have cut out all the bureaucracy and just got the patient to the right place. NHSD 3*

*As an initiative, if it's the first part, which is the patient information, then I think it's underselling itself if it's just the patient information bit. I think to get any value and to get an effective value out of the system it has to be tied in to GPs, to dentists, to other*

*prescribing professions, rather than just a stand-alone information and advice, which could be quite, well it can be quite costly just the advice itself without any local integration within existing services. Other 1*

Second, they wanted to involve more services such as dentists, pharmacists, social services, health visitors and so on. This involvement was described in different ways. Examples included having out-of-hours emergency dental services linked to NHS Direct, having pharmaceutical expertise in NHS Direct, or linking to existing services, taking on new tasks like health education, making appointments with GPs and hospitals, and reminding people of their appointments to reduce numbers not attending. Although many people saw the potential for this latter service, some did not welcome it.

*Well, I know they've been talking about appointment systems but I'm not completely sold on this yet...Well, I mean they're talked about, they've got the facility to do all appointments, hospital outpatients, things like that, but I'd have to make sure it's the right thing to be done...If it just comes as one big body, you're never going to get through the system. Other 3*

#### 9.3.3.2 Facilitate routes into the NHS

Some stakeholders had a vision of NHS Direct as a gateway to the whole of the health service. They wanted a single gateway to be as accessible as possible, by increasing the ways people could access NHS Direct, such as through the Internet and kiosks in public places.

*Very much that it does become this gateway to the NHS. I'm sure we will move to a much more managed primary care service. I think NHS Direct has real opportunities for assisting primary care in the management of their workload by perhaps supporting them in early intervention, emergency appointments...So I think bringing all callers through NHS Direct out-of-hours is a starting point to that. NHSD 4*

*And I think that's another, a way I'd like NHS Direct to go, is the forefront of technology, you know, use all of these different media to do it but keep your feet on the ground.*

**NHSD 2**

#### 9.3.3.3 Slow down

Some stakeholders felt that the speed of change had been fast, and that there was a need to ensure everything was working well before further developments were implemented.

*It has to learn to walk before it runs. Nurse advice, health information – get it solid and robust and working properly. A&E 4*

*But I do think it needs very careful management and I do think the speed of that growth of development is a bit freaky. NHSD 1*

## **9.4 Discussion**

In principle, NHS Direct was seen to offer new opportunities to a range of groups: for health service users, it could improve ease of access to information, advice and services; for nurses, there was the prospect of new skills and new roles; and for managers, the possibility of helping to manage demand for other NHS services. Yet it was also seen as a potential threat to the finite resources of the NHS and to other health services. GPs, in particular, saw themselves – and were seen as – threatened by NHS Direct, although the GPs in this study could also see the potential of the service. We can better understand the opportunities and threats seen as existing in principle, and the stances people took in practice, if we view NHS Direct in the context of organisational change. While NHS Direct is a new and potentially powerful technology introduced into the complex organisation of the NHS, it also makes implicit – and increasingly, explicit – demands on the NHS to change the way it operates in the future, for example, that NHS Direct ‘should herald a fundamental shift in the NHS’.<sup>48</sup> But what does such a shift entail? Does NHS Direct herald an increase in consumerism, or perhaps a reduction in professional monopoly in the NHS? These themes are discussed below.

In practice, implementing NHS Direct in its first 18 months threw up a host of operational and policy dilemmas, including the need to balance national and local influences on the service, to balance costs and safety, and to generate enough demand for the service to prove itself without generating so much that it failed to cope.

The future vision of this new service was one of expansion into different roles and integration with different services, with service providers preparing to progress rather than simply maintain the current service.

### **9.4.1 Limitations of this study**

The way that stakeholders are selected can influence the findings of a study. In this study, we chose to select members of the “official” stakeholder groups rather than attempting to interview others who might not be taking such an active role in NHS Direct. We took this approach because we felt that the former would have both a current working knowledge of and a close interest in the service. However, this might have introduced some bias if the people we interviewed tended to have a more positive view of NHS Direct than their colleagues who were not so involved. In addition, we did not interview representatives from health information and ambulance services separately from NHS Direct providers (who were all based in ambulance trusts), and thus excluded the views of agencies in early partnerships with NHS Direct. These would have been useful as NHS Direct and other agencies integrate in the future.

#### 9.4.2 Generalisability

This study was based around the three first wave NHS Direct sites and it is possible that our findings might not be generalisable to other sites. The first wave sites were the “pioneers” of NHS Direct and may have encountered difficulties not faced by those who followed. However, since each site has been new to its geographical location and local agencies, it is likely that each has faced similar issues in its relationships with existing health services. We believe that few if any of the issues raised above are specific to first wave sites.

Indeed, there is a close correspondence between many of the results from this study and qualitative research undertaken in 1999 in two London NHS Direct sites.<sup>49</sup> In that study, 29 health professionals and user representatives involved in the introduction of NHS Direct were interviewed about the implementation of the service and its possible future roles. Themes which emerged in common with this study included the importance of partnership with other organisations, a feeling of alienation among GPs, tensions between centralising the service and retaining local flexibility, and concerns about the use of the service for GP appointments. The emphasis of the London work on implementation issues threw up additional themes not raised in our study, including the pace of information technology developments, the need for national standards for recruitment and the quality of protocols.

#### 9.4.3 NHS Direct in the context of organisational change

Major and strategic organisational change is rarely a smooth process. Resistance and challenge can be expected, as a result of concerns both about the value of the change and of perceived threats to the self-interest of individuals and groups.<sup>50</sup>

In the NHS Direct context, the resistance and challenge has come mainly from GPs. Many stakeholders, including GPs, expressed genuine concerns about NHS Direct in terms of its impact on other services. They wanted evidence to help to reduce the uncertainty around this organisational change and felt that they were being asked to “have faith” in NHS Direct, which did not sit easily with the evidence-based approach to service development which has been promoted as an ideal over the past decade. These broader questions about the costs and benefits of NHS Direct were accompanied, inevitably, by more immediate and self-interested concerns. Competition for resources and power triggers organisational politics, in which people act to protect self-interests.<sup>50 51</sup> Since GPs saw their role and resources threatened by NHS Direct, some of their resistance to NHS Direct may have come from a desire to protect their ‘turf’, most evident in their desire that NHS Direct be a clearly complementary service, not a substitute, for general practice, a sentiment shared by the general public who do not want NHS Direct to be at the expense of existing services.<sup>47</sup>

The arrival of NHS Direct in these first wave sites, which were all run by ambulance services, implied substantial organisational change not only in terms of developing a new approach to health care, but also in introducing a new service to an existing organisation. Such change can bring a clash of cultures, with tension between the 'newstream' and 'mainstream' services.<sup>52</sup> Typically, the newstream services complain that the mainstream moves too slowly and does not co-operate, and the mainstream services complain that the newstream is given rewards and privileges that they do not deserve. This may lead to frustration in the newstream services and falling morale in the mainstream services. There was some evidence of this within the ambulance services, with some service providers recognising the difficulties of handling this clash of cultures, for example nurses getting paid more than ambulance staff, and the different perceptions of funding available to different parts of the service. This 'clash of cultures' was also evident, outside the ambulance service, between NHS Direct and GPs, with the former apparently promoting a "consumerist" stance to health care which the latter had long resisted.

Although some writers on organisational change feel that such difficulties are inevitable, others argue that open communication can aid organisational change.<sup>52</sup> In our data, there was evidence both of strong and positive relationships, and of difficult relationships, between NHS Direct and other agencies. GPs have commented about the lack of consultation and involvement in NHS Direct at a national level, and in one site in this study cited exclusion at the local level in the early days of the service. Although there were examples of poor communication and involvement of GPs locally, there were also examples of NHS Direct trying hard to forge relationships with hostile or indifferent agencies. It seems likely that good communication is necessary, but not sufficient, for change to occur smoothly. Two agents are involved in any organisational change – the innovator and the responder.<sup>52</sup> In the case of NHS Direct, the main responder was general practice, which found itself in the less powerful position in a restructuring which had the potential to be yet more disempowering. It may be that no matter how good the involvement and communication, objections to the service would have arisen.

Are there any lessons to be learnt from organisational change which might help NHS Direct? One suggestion is not to attempt to stifle any challenge to change, but rather to acknowledge and address it, because of the potentially beneficial debate it can produce. Another is not to expect co-operation to happen easily when anxiety about the future is widespread. Treating agencies as partners, and not manipulated adversaries, and making structural links which make all parties interdependent may help – for example, the integration of GP co-operatives and NHS Direct. Seeing the service in operation, and reviewing the clinical algorithms in use, appears to improve the confidence of clinical professionals in the service NHS Direct offers. Local audits

which involve partner agencies seem important too. Such local involvement allows people to gain knowledge and understanding of the service, basing their views on facts, and brings a greater range of perspectives and expertise to the local development of NHS Direct. Inevitably, innovation makes progress by mistakes, so local joint audits are essential to check what is going well or badly.

Finally, reflecting on the size of this organisational change and the timescale in which it has occurred, it is clear that the effort required from those planning, organising and providing NHS Direct has been enormous. In a context of high expectations, uncertainty over the future shape of the service, and mistrust or hostility in the face of such rapid change, such efforts are all the more impressive.

#### 9.4.4 Consumerism, control and professional identity

Health service professionals and users may have conflicting interests when it comes to making health care more accessible. General practitioners in particular, as the major providers of first contact care, have felt under pressure as a result of increasing demand, and it is unsurprising that a service which aims to lower access barriers to health care will be seen as threatening in an immediate and tangible sense.

NHS Direct also poses other, less obvious challenges to existing arrangements, particularly in primary care. For example, as a 24-hour service it encourages the perception of health care as “always available” – noted by one GP above – which seems to run counter to the attempts of many GPs over many years to encourage their patients to contact them in-hours rather than out-of-hours. While NHS Direct may see itself as a solution to the issue of unnecessary demand out-of-hours, it is not altogether surprising that others may see it as contributing to the problem. This concern is closely linked to the perception, also noted above, that NHS Direct embodies or encourages a “consumerist” attitude to health care, something many health professionals instinctively regard with suspicion. Resolving this issue will require a debate which moves beyond the very broad notion of consumerism to an understanding of which of the component parts of current cultural and policy changes are desirable and which are not. For example, consumerism may include notions of increasing access to needed care, increasing user power and choice, sharing of information and so on, which many health professionals would support. However, it may also represent ideas of unreasonable or inappropriate demand, the provision of services on the basis of expressed demand rather than “need”, or the loss of personal relationships or ideas of continuity of care, which may be far less attractive to clinicians and policymakers alike.

In addition, NHS Direct poses a challenge to the existing roles of medical and nursing staff and to the relationships between them, and between doctors and their registered patients. Historically, there has been a strong emphasis in British general practice on

a “direct” relationship between the general practitioner and his or her list of patients. For the first time, this direct relationship has become indirect (at least out-of-hours) as a result of a new and ubiquitous intermediary, which itself claims to have a relationship yet more “direct” than that it supplants. The immediate effect of this is that the (out-of-hours) workload of general practitioners is no longer controlled by the practice itself, but is referred by another agency. Although still gatekeepers to secondary care services, GPs now find that a new gatekeeper is controlling access to primary care. While this may be welcomed by some doctors, others regard such loss of control as inevitably bringing a loss of professional status or power.

#### 9.4.5 A balancing act

In practice, as our respondents made clear, NHS Direct must attempt to balance various tensions. One of these revolves around the role of computer software in the process of clinical decision-making when triaging calls. The service has to consider the balance of cost, call time, safety, appropriateness and the nurse role. Respondents pointed out that highly prescriptive software might offer increased safety and appropriateness but might also increase call time and therefore increase operating costs, and possibly lead to deskilling of the nurses; conversely, less prescriptive software might decrease call times and therefore operating costs, and offer a clear role for the nurse, but possibly reduce safety and appropriateness. Such concerns are to a great extent speculative since currently there is little evidence which allows us to compare the implications of different approaches to triage decision support.

A second tension exists around demand for NHS Direct in relation to its resources. Low demand ensures that the service can cope easily and thus can offer longer call times, but creates provider anxiety that they are not seen as a relevant or “successful” service within the NHS. High demand might make the service feel important but overload will lead to reduced call times, stressed staff, lower caller satisfaction with access and dissatisfaction from other services working with NHS Direct.

Another example is the balance between national standards and local control of NHS Direct. National standards might ensure uniformity in the service but risk alienating local services, whereas local control might ensure ownership of NHS Direct but risk inconsistencies nationally.

These dilemmas are not easy to address and are by no means unique to NHS Direct. The National Plan addresses this latter dilemma for the NHS as a whole, proposing the solution of setting standards and clinical frameworks nationally, with continued opportunities for health professionals to innovate locally.<sup>7</sup>

#### 9.4.6 Expanding on all fronts

The policy vision for NHS Direct is of continued progress, rather than simple maintenance, of the current service. NHS Direct is expanding through extending its population coverage, the range of services on offer, the depth of relationships with other services, access routes into the service, and the roles of the service. In November 2000 the service expanded to cover the whole of the population of England and Wales. NHS Direct sites are increasing the range of services to which they relate and some of these innovations are being evaluated. For example, the Medical Care Research Unit is currently evaluating the addition of a formal pharmacy disposition in NHS Direct Essex. Some NHS Direct sites are triaging out-of-hours calls on behalf of general practice. An NHS Direct Online website is available and information kiosks have been opened in pharmacies with plans for further kiosks in A&E departments and other places. Consideration is being given to the role of NHS Direct beyond offering immediate care, for example in outreach and morbidity monitoring. Perhaps the most ambitious vision is of NHS Direct as a "single gateway" to the NHS. Given this hectic and apparently unremitting pace of change, it is no surprise that the speed of development was a concern for those involved in providing the service, with a strong desire to slow down and focus on making current aspects of the service work well.

#### **9.5 Conclusions**

The views of stakeholders consulted suggested widespread support for the principle of a service such as NHS Direct, and recognition of the many potential benefits which it might bring. However, there was much less agreement over the specifics of how such a service should best be implemented, and in particular concerns over the speed of implementation and the need to learn from research and audit to inform the implementation. As well as seeing the real opportunities presented by NHS Direct for patients and professionals alike, many respondents were also aware of potential threats, particularly in terms of unmanageable demand on the NHS. It may be that many of the concerns expressed by respondents could be addressed if there were now a period of consolidation in which NHS Direct and local health professionals were able to talk to one another about what has been achieved and what remains to be done.

## 9.6 Appendix: Interview schedules

### Agency's role and role in NHS Direct

Job title

Involvement with NHS Direct

- (i) salaried
- (ii) length of time involved
- (iii) depth of involvement

**About NHS Direct in general** (the national initiative and not the local service)

1. What do you think about the concept of NHS Direct (rather than your local service)

Prompt What is good about it  
What are the problems with it

2. What effect do you think NHS Direct will have on your service nationally?

Prompt Demand  
Appropriateness of demand  
Other issues

3. What would be the ideal relationship between your agency and NHS Direct?

4. How do you think NHS Direct should develop in the future?

### Your relationship with NHS Direct locally

5. What is your relationship with NHS Direct currently?

6. How has this changed over time?

7. How would you like to see it change?

### Effect of NHS Direct locally

8. What effect has NHS Direct had on your service?

Prompt Demand  
Appropriateness of demand  
Other issues

9. Can you give examples of this?

10. What effect could NHS Direct have on your service which you would like to see?

11. How could this be achieved?

### NHS Direct providers

1. Has the service achieved what it set out to achieve in the first year?

If YES, how?  
If NO, why?

2. Is the service being used in the way you wanted it to be used?

3. I want to focus on different services/agencies which NHS Direct has or may have a relationship with:

A&E  
ambulance  
GPs  
GP Co-ops  
self help/voluntary groups  
Social services  
other

(i) How are your relationships with \_\_\_\_\_ changing since NHS Direct was first established?

prompt practical links/integration  
co-operation

(ii) What effect do you think your service is having on \_\_\_\_\_

prompt demand  
appropriateness  
communication  
other

4. The original specification for the service set out a target number of calls per year for each first wave site. No site has met this target.

(I) How realistic a target was it?

(ii) What is a sensible target?

(iii) What needs to happen for you to reach this target?

5. NHS Direct is developing at a fast rate with the government making announcements about new directions for the service. How would you like the service to develop?

## **10. WHAT HAVE WE LEARNT ABOUT NHS DIRECT?**

This third report to the Department of Health, which is also the final report of the research originally commissioned on the first wave sites, presents a natural opportunity to look back over the first three years of the NHS Direct telephone service and take stock of what has been learnt to date. Of course, an enormous amount has been learnt by service providers themselves about what is involved and what works well in running NHS Direct, but our purpose here is to offer an independent external assessment of NHS Direct, based on the evidence available to date. While some of the evidence comes from our own studies of the service, there have also been important contributions from other academic researchers, as well as from practicing clinicians, the Department of Health, and other bodies, such as the Consumer's Association and community health councils.

### **10.1 NHS Direct is a well-used and rapidly developing national service**

We begin with what might appear obvious, but is nonetheless remarkable. Over the past three years, NHS Direct has been transformed from an idea into a reality. The evidence indicates a well-used, functioning service whose pace of development shows no sign of slowing, and which is available across the whole of England and Wales. It is hard to think of other new health services which have developed so rapidly and had so great an impact on how people – policymakers and the public alike – think about access to health care.

We make this point because the reality could easily have been different. It is not difficult to imagine a scenario in which NHS Direct was only patchily or inconsistently available, or in which it was available but not used. The example of the Health Information Service, a forerunner to NHS Direct's information providing role, shows that simply providing a telephone service is no guarantee of widespread awareness or use. Although NHS Direct has had some well-publicised teething troubles dealing with peaks of demand, particularly over the busy millennium period, it has generally responded well in expanding capacity.

In addition, our evidence shows that the population's use of NHS Direct is increasing, suggesting that it responds to an unmet need, although the service is still a comparatively small player in relation to the total volume of unscheduled health care, being used in about 5% of all episodes of ill health where unscheduled care is sought. We have noted, however, that use of NHS Direct is made particularly by young adults or on behalf of children, and use among older adults is lower than we might expect. Although this may reflect the greater experience and knowledge of older people in dealing with health and health care, it is also possible that it represents an increasing marginalisation of older people from accessing services through "new technologies" such as the telephone, the web, email or digital TV. If health care policymakers

continue to develop the role of such technologies in accessing the health service – and if this approach becomes more widespread, as the development of the social care helpline Care Direct suggests – then an understanding of how this will impact on older users of services is urgent.

More broadly, other dimensions of inequality of access to NHS Direct may exist, although we have no firm evidence of this to date. Accessing health care by telephone may present difficulties for those with communication disabilities or for those whose first language is not English. We are aware that NHS Direct providers have made vigorous efforts to address such issues by providing translation services through Language Line, and access routes for those who are hearing impaired. It is now important that evidence is gathered which allows an assessment of how accessible NHS Direct is to all groups, and where there might be room for improvement.

## **10.2 NHS Direct appears as safe as other routes to health care**

Both direct and circumstantial evidence on the overall safety of the service is available. In our research on first wave sites, we have monitored the local and national press over a two year period, written to coroners and sought instances of “critical events” from local A&E consultants and site managers. Similar work has been carried out elsewhere.<sup>32</sup> The evidence available suggests that serious adverse event rates are low, and appear to be lower than in other triage settings.<sup>5</sup>

The circumstantial evidence available from the views of callers – and in particular NHS Direct’s high satisfaction rating – would tend to support this conclusion. It is unlikely that so many callers would rate the service highly if, after receiving advice from NHS Direct, they suffered an adverse health outcome or needed emergency care which NHS Direct had not advised. If anything, our impression is that if callers complain about the advice they receive, they are more likely to complain about over-triage than under-triage. Together with some limited evidence from services which accept “referrals” from NHS Direct,<sup>16 17</sup> this may indicate that NHS Direct tends to err on the side of caution.

As we have discussed previously, the low critical event rate associated with NHS Direct does not provide strong evidence of accurate or consistent triage decision making, since a large proportion of its casemix is made up of conditions which would be likely to resolve in any case without serious harm. Further detailed studies of NHS Direct telephone triage are needed. Although the second phase of evaluation, which is now underway, addresses the broad issue of triage appropriateness, there is scope for studies of the triage performance of the new NHS Clinical Assessment System in defined clinical conditions.

### **10.3 Callers appreciate NHS Direct**

There is no doubt that a large majority of callers find NHS Direct a helpful and satisfying service to use.<sup>20</sup> Both our own callers surveys in first wave sites and others conducted by academics in South London and in Hampshire, as well as smaller surveys undertaken by community health councils and by the Department of Health itself confirm this finding.<sup>32 53</sup> Most callers indicate that they find the service friendly, prompt and professional, and the advice helpful and practical.<sup>4</sup> An important finding is that NHS Direct provides many callers with reassurance that they can care for problem themselves, or that they are justified in making use of the health services.<sup>20</sup>

However, not all callers are happy with the service. Important sources of dissatisfaction have included difficulties in getting through to the service or delays in being able to speak to a nurse.<sup>54</sup> In addition, some callers are unhappy about the number of questions asked, and in particular basic questions about name, address, GP and so forth in a context where they feel that their problem is urgent.<sup>4</sup> Anecdotal reports in the media of poor advice from NHS Direct,<sup>55</sup> coupled with more systematic but still limited evidence from the Consumers' Association,<sup>19</sup> suggest that improvements might be made in the quality and consistency of the self-care advice offered.

### **10.4 NHS Direct has not been unhelpful to other services**

Before NHS Direct was launched, optimists saw the potential of such a service to reduce demand for immediate health care while pessimists worried about the potential to increase it yet further (see *stakeholders' views*, this report). The evidence available to date suggests that, in the context of relatively modest call volumes, NHS Direct in its first year had little impact on demand for other services, and may have halted the growth in demand for out-of-hours general practice.<sup>34</sup> Clearly, the impact which NHS Direct is able to have on demand – whether up or down – is centrally dependent on the ratio of NHS Direct use to the use of other immediate care services. The present situation, in which the volume of contacts with A&E departments or out-of-hours primary care is far greater than that with NHS Direct, inevitably means that its impact on those services can only be small. Conversely, as call volumes continue to rise we might expect to see some effect on immediate care demand, though whether the optimists or pessimists will prove to be right is still an open question.

We should take this opportunity to note that studies of callers' statements on "what they would have done" had NHS Direct not been available, and "what they will do" following the call, can not give us any reliable measure of the impact of NHS Direct on services. There are a number of reasons why this is the case: callers may not know what they would have done; they may not do what NHS Direct advises; NHS Direct may be only one contact of many in an episode of care; and while NHS Direct diverts

about half of callers from one intention to another, it also appears to induce new health care contacts which will affect overall demand.<sup>34</sup>

There is the further issue of the effect of NHS Direct on the casemix of other services. The hope has often been expressed that, irrespective of its effect on overall demand, NHS Direct might improve the casemix of services such that a greater proportion of users are deemed (by the service) to be appropriate. The experience of the first year demonstrated little effect on casemix, as judged by the triage decisions of the receiving immediate care service.<sup>5</sup> More recent evidence from one study in A&E,<sup>16</sup> and reports from primary care co-operatives,<sup>17 18</sup> suggest that the casemix of patients referred by NHS Direct may be of broadly similar severity to that of self-referred patients. From the service providers' viewpoint, this is taken as evidence that NHS Direct is indiscriminate in its triage decisions.

Unfortunately, however, such studies are unable to tell us very much about the sensitivity and specificity of NHS Direct triage, since they contain no information on the cases which NHS Direct does *not* refer. To take a simple analogy, the size of the waves within the harbour are no guide to the efficacy of the harbour wall, if we know nothing of the severity of the storm further out to sea. As demand on the health service grows – as it has done relentlessly for very many years<sup>2</sup> – and the use of NHS Direct increases, it is possible that from a service provider's viewpoint casemix will change only little, even though NHS Direct effectively filters out those who do not need such care. The reason for this apparent paradox is that triage decisions, like screening and diagnostic decisions in general, are never perfect.<sup>56</sup> Even if NHS Direct has a high specificity for referral, some proportion of those it refers will be seen as "inappropriate" by the receiving service. Indeed, if the proportion of NHS Direct callers with serious health problems falls as call volumes rise, then the proportion of referred patients judged "inappropriate" will also rise. At the same time, it is plausible that those patients who self-refer directly to a service such as A&E, rather than calling NHS Direct for advice first, are more likely than NHS Direct callers to have a serious health problem. The result of this selective self-referral, alongside NHS Direct's referral specificity of less than 100%, is that the proportion of patients deemed "appropriate" may always be at least as large among self-referred as among NHS Direct-referred patients. However, an interesting point is that the overall casemix of both self-referred and NHS Direct-referred groups *may* be more appropriate than it would have been without NHS Direct at all.

### **10.5 NHS Direct is facilitating broader service developments**

The effects of NHS Direct have been felt more widely than the direct experience of callers and the workload of immediate care providers. Rather than being simply a stand-alone development, the existence of a nationally available telephone service

using structured decision support systems has acted as a catalyst for changes in other services. The most notable example is of the changes currently underway in the provision of out-of-hours primary care, which is now moving towards a standardised service model with clear accountability and quality standards.<sup>6</sup> Software used in NHS Direct is to be deployed in a wide range of first contact care settings, such as walk-in centres. There is also the possibility that the least urgent (category C) calls for an emergency ambulance may be triaged by NHS Direct.

In addition, other uses for NHS Direct are emerging such as the ability to support “look-back” exercises for those at risk of hepatitis C, the provision of advice to parents during meningitis outbreaks, or the potential for new forms of infectious disease or other public health monitoring.<sup>57</sup> The NHS Plan talks of a “one-stop gateway to health care”.<sup>7</sup> The existence of NHS Direct seems to be allowing policymakers and service providers to think in new ways about access to health care.

#### **10.6 NHS Direct represents an additional cost to the NHS**

The issue of the overall “cost-effectiveness” of NHS Direct is far from straightforward. From the perspective of the NHS, the costs of NHS Direct include both the costs of the service itself and any cost consequences which follow – for example, increases or reductions in the use of other services. At this stage, any effect on other services, and therefore any cost consequences, appear negligible. The economic cost of the service to the NHS therefore equates to the direct cost of providing it.

What are the valued benefits which follow from this expenditure? At this stage in the evolution of NHS Direct, the available evidence suggests that the principal outcomes of the service include substantial reassurance to callers, some reduction in the increasing pressure on out-of-hours primary care, and the opportunity to reconfigure related immediate and emergency care services. The quantitative valuation of such benefits is problematic, though it would be possible to pursue the question of measuring the value of reassurance further, so that NHS Direct might be compared with, for example, other settings in which health information is provided to patients.

#### **10.7 NHS Direct is good – but it isn’t perfect**

Our overview of the evidence currently available suggests to us that NHS Direct has achieved a great deal in a very short time. However, there are also clearly areas where critical self-examination or further development is needed, and we have highlighted some of these above.

We would conclude by noting that, in a context of very rapid service development and technological change, the past – and the research findings of the past – can be only a tentative guide to the future. Rising call volumes, a new decision support system, an ever expanding scope of activity and increasing public expectations create a very

challenging climate within which NHS Direct must develop. The service must ensure that strong clinical governance, vigorous clinical audit, routine monitoring of activity and accessibility indicators and a diverse programme of evaluation are all in place so that NHS Direct can maintain the trust of its users and go on to develop its full potential.

## **11. ACKNOWLEDGEMENTS**

The authors would like to thank staff of the first wave *NHS Direct* sites for their considerable help and patience in assisting the research team. We would also like to thank all those many individuals, including staff of NHS Direct sites, local services, the software companies and the NHS Executive, who have kindly provided data for the analyses reported here. Mike Clancy, Steve Goodacre, and Mark Pickin gave valuable help in rating appropriateness, Janette Turner and Liz Webber in assessing compliance, and John Brazier and Simon Dixon in advising on the economic analyses.

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# Appendix: Evaluation of the suitability of medical coding systems for recording *NHS Direct* encounters

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## 1. SUMMARY

Here we present results of a preliminary investigation towards proposing a standard case mix coding schema for *NHS Direct*. The current state of the art, including strengths and weaknesses of the four major classification schemas (ICD-9/10, Read Codes, ICPC and SNOMED) are reviewed. The conclusion is that there is currently no “best” coding system, and also, coding systems are in a state of transition. The recommendations are therefore for a pragmatic decision. Two options are presented. One is to adopt what we believe is currently the best system for the *NHS Direct* coding, i.e. ICPC 2 PLUS, with the use of ICD-10, where a more specific nomenclature is required. The alternative is to taking into account the planned emergence of an international standard coding system, through the merging of Read Codes Version 3 and SNOMED RT, and the need to anticipate and conform to it. If this is considered a priority we recommend adoption of Read Codes Version 3 as an interim measure. Further research is proposed for an empirical validation of the coding system(s) chosen.

## 2. INTRODUCTION

NHS Direct is a 24 hour nurse-led telephone helpline which aims to provide advice and information to callers to help them access the care they need, or to care for themselves at home. People call the service with a wide range of health-related information and advice needs. Computer decision support systems (CDSS) are at the heart of service, and are used to assist triage decisions for all callers seeking advice for an immediate health problem. The computer software systems in use both support the triage process and log the details of each clinical interaction with the service.

Previously, all NHS Direct sites have used one of the three systems listed in table 1. In the first wave of three sites, each used a different system. By the time of the third wave of sites, each system was in use in approximately equal numbers.

However, in September 2000 the government announced that a new CDSS, termed the NHS Clinical Assessment System, would replace these, so that a new single system would be in use across England by April 2001 (now revised to August 2001).

Although each system provides sophisticated support for triage, to date there has been very limited support for the clinical coding or classification of the problems which present to NHS

Direct. A clear and consistent system for the clinical coding of presenting problems is essential to the further development of the service to allow casemix to be compared over time and between sites, to support clinical audit and quality improvement processes, and for research purposes.

However, none of the initial systems used by NHS Direct provided for the routine clinical coding of callers' problems using a standard system. The degree of casemix classification provided in the systems is described in Table 1. It would clearly be desirable for all systems used by NHS Direct sites to support the same common standard for clinical coding.

**Table 1: software CDSS used by NHS Direct**

Software	Supplier	Origin	Clinical coding
Personal Health Advisor	McKessonHBOC	US	ICD group of most serious non-excludable diagnoses
Centramax	McKessonHBOC	US	None
Telephone Advice System	Plain Software Ltd	UK	None initially, Read in latest version
NHS Clinical Assessment System	AXA	UK/French	Unknown

Since autumn 1997 Medical Care Research Unit at the University of Sheffield has been undertaking a wide ranging evaluation of *NHS Direct*, initially focusing on the description of the sites, their activity, safety, effectiveness and impact on other NHS first contact care services. This work is ongoing. The Unit was also asked to review currently existing medical coding systems and present a reasoned case for the adoption of one of these as a routine system for NHS Direct. This work is reported here.

### 3. THE APPROACH TO THIS EVALUATION

Of necessity, the evaluation methodology is a desk top study based upon a literature review. A follow-up empirically based study is necessary to validate specific systems.

The literature search was designed to answer the following questions:

- a) What are the leading coding systems and what is their current status?
- b) What are the specific requirements of a coding system for *NHS Direct*?
- c) By what criteria should candidate *NHS Direct* coding systems be evaluated?

d) To what degree does each candidate system satisfy those criteria?

The following sections address each of these questions in turn.

#### 4. CURRENT STATUS OF LEADING MEDICAL CODING SYSTEMS

A coding system is designed to represent information as coded data. Such a system may potentially have three distinct roles: as a medical **nomenclature**, that is, a list or catalogue of approved terms for describing and recording clinical and pathological observations; as a **classification**, a method of generalisation to obtain data about groups of cases rather than individual occurrences; and as a **thesaurus**, an indexed store of terms and synonyms. The advantages of using a coding system include the following:

- saving space;
- reducing data transmission time and cost;
- concealing informational content;
- achieving efficiency in database searching;
- protecting the integrity of transmitted data;
- increasing efficiency and accuracy of data entry;
- achieving a uniform understanding and consistent interpretation of data.

To these we would also add:

- a coding system should provide a homogeneous representation of information as data, across heterogeneous information systems.

The latter is desirable to allow integration of information systems within an organisation, and is necessary for seamless flow of information within a large organisation, such as the NHS.

The ten characteristics of a good (sound) coding system identified by the US National Bureau of Standards and the American National Standards Institute's Committee X3: Computers and Information Processing, are:

Uniqueness	Versatility
Expandability	Sortability
Conciseness	Stability
Uniform size and format	Meaningfulness

Simplicity

Operability

The above are generic attributes which relate to two separate aspects of a coding system: the **syntax** – that is, the rules by which codes are constructed – and the **semantics** – that which is denoted by individual codes.

The *syntactic* characteristics of a code are to do with *verification* that the code entered is the intended code and that the code read is the one originally entered. The syntactic aspects determine how resilient coded data is to undetected recording and transcription errors, as well as its suitability for subsequent processing such as statistic analysis or sorting.

Coding systems vary in their resilience to error. Although bit-wise data representation and transmission are safeguarded by systems-level mechanisms, there is still potential for information loss through errors in the keying of data. Well-constructed codes can reduce the likelihood that such errors will pass undetected. For example, by maximising the hamming distance between consecutive codes the number of digits that must be altered to transform one valid code to another is increased. In the case of computer-supported coding systems, hamming distance is devolved to differences in rubrics or keywords.

Processing of codes is assisted if codes have properties analogous to those of number systems, such as an ordering which allows comparison and sorting of codes in meaningful ways. For example, the difference between codes that represent similar concepts should be less than that for dissimilar concepts.

The *semantic* aspects determine the capacity of the coding system to represent the required range of information at an appropriate level of abstraction.

There is currently no standard or *de facto* standard clinical vocabulary and classification scheme for coding clinical activities in health care. However, such a standard is clearly desirable, for integration and communication of knowledge, experience and evidence from the many areas of health care.

In 1995 a conference sponsored by the US Agency for Health Care Policy and Research (AHCPAR) published a consensus report on developing a common clinical vocabulary for primary care.<sup>1</sup> This report suggested a number of criteria for a standard, from the perspective of primary care, and these are reproduced in Table 2, below.

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**Table 2: Criteria for a clinical coding standard for primary care**

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<b>Clinical relevance</b>	Able to deal with: uncertainty; temporal evolution of clinical problems; clinically relevant
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	nuances; pertinent negative terms
<b>Rich vocabulary</b>	Unambiguous, non-redundant and appropriate; supports synonyms and homonyms; supports qualifiers and modifiers of terms; maps to other codes; supports documentation needed for education and training
<b>Easy data collection</b>	Allows: seamless and effortless data collection; reliable and valid data input and output
<b>Sound architectural infrastructure</b>	Broadly available; supports multiple levels of granularity; internationally used; structure for maintenance and updates, including version control; extensible in a controlled way; multilingual and multicultural
<b>Consistency</b>	Usable in all primary health care settings; supports work flow
<b>Aggregation and analysis</b>	Must support clinical protocols and guideline implementation; research; decision support; patient-focused outcomes measures

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The report concluded that “it would be premature, misleading, and destructive to recommend any one vocabulary over another”, given that “development of clinical vocabularies is a process in progress”. The report anticipated that the best properties of current systems might merge to form one system for primary care, comprising either one or a suite of vocabularies.<sup>1</sup>

It also reviewed the strengths and weaknesses of the current leading systems: ICPC, Read Codes, SNOMED, and UMLS (Universal Medical Language System).<sup>\*</sup> Of these, Read Codes have been adopted by the NHS as the UK standard, ICPC is the closest to a *de facto* international standard clinical terms classification system for primary care (often used in combination with ICD systems to provide a nomenclature), and SNOMED is the dominant US system. The consensus report recommended that ICPC, Read Codes and SNOMED should form the basis for a future integrated system, and that all primary care vocabularies should be added to UMLS, as a potential linking mechanism between coding systems.

Events have proved the conference recommendations and the prediction of a convergence of systems to be perceptive. In April 1999 the UK Department of Health announced that Read Version 3 would merge with SNOMED-RT to produce an internationally accepted standard.<sup>2</sup> The merging exercise is planned as a collaboration between the College of American Pathologists (CAP) and the UK Secretary of State for Health on behalf of the NHS Executive. It is claimed that this integration will combine the strengths of the two systems, “the robust strength of SNOMED-RT in speciality medicine, including pathology, and the richness of Read Codes Version 3 in

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<sup>\*</sup> UMLS is the odd one out since it is not a classification system, thesaurus or nomenclature, but a database access system, which includes both medical and scientific terms. It originally stored keywords from Medline but has been extended to include classification terms from other systems. Its use is as a search engine to access information from multiple sources using different medical terminologies. However, UMLS has been used experimentally in the US for coding medical problems.

primary care.” SNOMED-RT and Read Codes Version 3 will continue to exist separately, until the integration is complete.

However, the conclusions of the consensus report are not universally supported. For example, SNOMED has its detractors. One evaluation of coding systems for computerised clinical systems focuses on ICD, Read Codes, and ICPC.<sup>3</sup> SNOMED is briefly considered, under “other systems”, as “a constructionist model which allows the development of highly specific codes which may be extremely useful in pathology.” The assessment of the suitability of SNOMED for primary care argues that: “The level of specificity it allows goes far beyond the interests of primary care...The system allows you to build nonsensical constructs...Its structure may be suitable to the reductionist theory of specialist practice but is the very antithesis of holistic care...it [SNOMED] is not widely used in general practice.” SNOMED possesses a semantically rich structure in which terms are related within multi-dimensional structures, although this has been criticised as complicating the coding exercise with “semantic spaghetti”.

In summary, there is currently no official or *de facto* international standard clinical coding system. There is no consensus on what that standard should be based upon. There is disagreement over which system is currently the “best”. At the same time, systems are evolving with some degree of convergence, as the planned merger of Read codes and SNOMED illustrates.

## **5. MEDICAL CODING SYSTEMS WITHIN THE *NHS DIRECT* CONTEXT**

### **5.1 Requirements analysis for NHS Direct coding**

Clinical coding of *NHS Direct* activity can potentially provide a rich source of data for recording, monitoring and analysing encounters, both within *NHS Direct*, and within the wider context of healthcare. In this context, there are a number of clear candidate coding systems which should be considered: ICPC, Read Codes, SNOMED and ICD-9/10.

None of these are at the end of their development cycle, and continued expansion and convergence is anticipated, as argued above. Each offers a coding system that delivers unique and concise codes. Each is an expandable system, as their continuing development shows, but a consequence of this is limited stability. In particular, the choice of either SNOMED or Read Codes would be an interim solution, since both are likely to change significantly over coming years, as these two standards are merged.<sup>2</sup>

Each of the candidate systems is based upon simple hierarchical classification of concepts, with the exception of SNOMED, which has a more complex multi-dimensional knowledge representation. SNOMED is also distinguished by its attempt to cover a much wider scope than the other systems. Versatility is limited by the scope of the coding system. However, the four candidate systems have been selected partly because of their coverage of the medical terms

relevant to *NHS Direct* encounters.

The candidates all exhibit uniform size and format and deliver sortable codes. Meaningfulness is limited. Each is primarily based upon a numeric coding system that is meaningful only from the rubric to which the codes are mapped. Some limited meaningfulness is provided by the use of letters with mnemonic properties. For example, ICPC codes generally lack intuitive meaning, apart from the first letter, which has a loose correspondence to the first letter of the areas that it concerns. Operability is provided for each by computerised tools. Finally, none of the codes has been designed to be resistant to recording, transcription or communications errors. For example, in each case, alteration of a single digit will transform a code into another valid code, thus allowing errors to go undetected.

The selection criteria must therefore be based primarily on the relative complexity of the systems, semantic features and pragmatic considerations, such as standardisation and support.

## **5.2 Semantic requirements**

Semantic considerations concern the extent to which a coding system can represent concepts within the relevant domain at appropriate levels of abstraction, and the extent to which it represents the important relationships between concepts – for example, between concepts which are a generalisation or specialisation of others. This is important if semantic heterogeneities that are a consequence of intra- and inter-coder variations are to be resolved.<sup>4</sup>

Given the open nature of the *NHS Direct* service, the scope of the coded information must relate to a wide range of problems and services, including: minor illness and injuries, use of health and social care, including mental health care, dental care, pharmacy and voluntary sector services, and provision of health information.

In its current role *NHS Direct* aims to provide a preliminary assessment and possible referral for presented health problems, but does not attempt to provide a definitive, or even a working, diagnosis over the telephone. Any coding system must therefore be judged not on the scope and precision of the diagnostic categories it makes available, but on its ability to code a wide range of vague, undifferentiated “reasons for encounter” with *NHS Direct*.

## **5.3 Pragmatic considerations**

Pragmatic considerations may cause one system to be favoured, even though it is known to be inferior to others. For example, important considerations might include an existing *de facto* standard in which investment has already been made; the need for comparison with data from other systems in use, whether in the NHS or internationally; and cost.

#### 5.4 Evaluation criteria

With these points in mind, our evaluation criteria are presented in table 3, below.

**Table 3: evaluation criteria for clinical coding systems**

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<i>Syntactic</i>	<b>Complexity</b>	Is the coding system simply structured? Is the number of concepts sufficient but manageable?
<i>Semantic</i>	<b>Scope</b>	The scope should allow all significant information relating to <i>NHS Direct</i> encounters to be encoded
	<b>Level of abstraction</b>	As well as providing an appropriate nomenclature, the structure of the system should provide appropriate classifications at different levels of specificity and generality
<i>Pragmatic</i>	<b>Acceptance</b>	There are clear advantages to adopting a code that is an official or <i>de facto</i> standard within the UK and/or internationally
	<b>Availability</b>	The coding system and support tools should be widely available at low cost
	<b>Compatibility</b>	Translation between the selected code and other codes is desirable – for example, to support integration of data across the healthcare system

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The following sections provide a more detailed review of candidate coding systems in the context of these criteria.

### 6. REVIEW OF LEADING MEDICAL CODING SYSTEMS

In this section we briefly review each of the candidate coding systems, applying the evaluation criteria on the basis of available published evidence, since a full empirical validation is not feasible within the scope of this project. However, the literature does suggest that coding systems have been a focus of much development and analysis in recent years. In particular, we have found much useful material in the “Report of Consensus” and in work by Helena Britt.<sup>1 3</sup>

Of the evaluation criteria above, the most critical is **scope**. Clearly, a coding system which cannot represent the required concepts is unusable. On the basis of this criteria, the ICD (International Classification of Diseases) and UMLS (Unified Medical Language System) coding systems can be eliminated, for the following reasons.

ICD is the most popular system for coding diagnoses. For example, in the UK ICD codes are mostly used by hospitals and physicians for statistical analysis, but Read Codes are used for coding clinical care. In Europe, ICD-10 codes are used in acute care and for statistical purposes, but ICPC is mainly used to code symptoms and diagnosis in primary care. In the US, ICD-9-CM (a clinical modification of ICD-9) is used by for discharge coding purposes in all non-military hospitals and on bills for insurance companies. Similarly, Canadian hospitals have used ICD-9-CM (and are converting to ICD-10) on hospital reports on discharges for the Canadian Institute of Health Information.

However, we can eliminate ICD for *NHS Direct* coding, since the requirement in that setting is primarily for recording pre-diagnosis information, such as reason for encounter. ICD has also been criticised for its “false terminology with little relation to the natural language of clinicians” and the infrequency of updates to maintain currency with changing medical terminology.<sup>3</sup> However, if the nomenclature provided by ICD were required, using ICD in conjunction with a more suitable classification system could provide this. For example, ICPC can be mapped to ICD-10.

UMLS is not considered a candidate, since it is not a coding system, but instead provides a search engine for multiple sources, possibly using different coding systems.

The following subsections review each of the remaining candidate coding systems. The reviews are collated and analysed in the final subsection.

## **6.1 ICPC-2**

### **6.1.1 Background**

The first version of ICPC (The International Classification of Primary Care) was defined by the International Classification Committee of the World Organisation of Family Doctors (WONCA) in 1987.<sup>5</sup> ICPC was subsequently revised in 1998 and re-published as ICPC-2. The revision to ICPC was to establish a mapping to ICD-10 so as to support translation between the coding systems, and to add criteria and cross referencing for many of the rubrics.

Computer assisted classification can be undertaken using ICPC-2 PLUS, which is “an extended database of coded medical terms classified by the internationally recognised standard of ICPC-2.” ICPC-2 Plus is designed for use in computerised clinical systems, information retrieval systems, disease registers and secondary coding of clinical data. Its scope includes coding for: patient reasons for encounter; diagnosis; and diagnostic and therapeutic interventions.

### **6.1.2 Description**

ICPC provides definitions in 17 chapters corresponding to areas of medical classification (identified by a single alphabetical character that is also the first character of each code within that chapter). The letters are near mnemonic; for example S identifies the “Skin” chapter, and K the “Circulatory” chapter. Within each chapter, terms are defined within 7 component areas (Figure 1). ICPC is therefore a hierarchical classification, but only provides specific codes for the more common or important problems dealt within primary care. It provides completeness of coverage within its scope by providing codes for concepts not explicitly classified – referred to as “rag bag” codes by Britt.<sup>4</sup>

**Figure 1: The bi-axial structure of ICPC**

Components	General	Blood	Digestive	Eye	Ear	Circulatory	Musculoskeletal	Neurological	Psychological	Respiratory	Skin	End/met/nut	Urinary	Pregnancy	Female genital	Male genital	Social
	A	B	D	F	H	K	L	N	P	R	S	T	U	W	X	Y	Z
1. Symptoms and complaints																	
2. Diagnostic, screening, prevention																	
3. Treatment, procedures, medication																	
4. Test results																	
5. Administrative																	
6. Referrals and other reasons																	
7. Diagnoses, disease																	

6.1.3 Evaluation

**Table 4: ICPC assessed against evaluation criteria**

<i>Syntactic</i>	<b>Complexity</b>	the coding system has a simple hierarchical structure. "ICPC is small enough to handle, having only 1300 rubrics" (Britt, 1996)
<i>Semantic</i>	<b>Scope</b>	The scope of ICPC covers that of <i>NHS Direct</i> encounters well. However, only the most common problems managed in general practice are defined. Others are covered by the "rag-bag" codes
	<b>Level of abstraction</b>	the structure "follows the natural process of primary care and facilitates access to meaningful morbidity groups" (Britt, 1996)
<i>Pragmatic</i>	<b>Acceptance</b>	ICPC has the advantage of being used as an international standard
	<b>Availability</b>	ICPC is widely available at low cost
	<b>Compatibility</b>	Translation between ICPC and ICD-10 is supported, but in general, ICPC does not map to other codes

ICPC has been criticised as lacking specificity for clinical systems. ICPC PLUS was defined by the Family Medicine Unit, University of Sidney, to address this weakness. It reduces the lack of specificity for clinical systems by adding an extension based on "reason for encounter" data

collected from GP-patient consultations. The terms were classified according to ICPC, but given extension codes, to facilitate easy access.

## 6.2 Read codes

### 6.2.1 Background

The Read codes were developed by Dr James Read, a general practitioner in Loughborough, UK, and have been widely adopted throughout the NHS. The Joint Computer Group of the Royal College of General Practitioners and the General Medical Services Committee of the BMA recommended in 1988 that general practice clinical information systems standardise on the use of Read Codes.

### 6.2.2 Description

Read codes provide a comprehensive nomenclature of medical terms derived from international classifications, such as ICD-9 and OPCS 4. Preferred terms for each concept are arranged in a hierarchy that groups terms in a way that is clinically meaningful. The hierarchy can be expanded at each level without disrupting the position of existing terms. Each preferred and non-preferred term has a unique alphanumeric code. The code does not represent a position in the hierarchy. Read codes have evolved through successive versions over a number of years, with the current version called *Clinical Terms Version 3*.

### 6.2.3 Evaluation

**Table 5: Read codes assessed against evaluation criteria**

<i>Syntactic</i>	<b>Complexity</b>	Analysis can be difficult because of the size and structure of Read Codes
<i>Semantic</i>	<b>Scope</b>	Read codes were developed by a GP for use by GPs. This has resulted in broad clinical coverage across disciplines. A study by the Computerised Patient Record Institute (CPRI) II in the USA showed Read Codes to be slightly less comprehensive than SNOMED, but with better clarity and cross mapping. (However, this study was flawed, since it failed to take account of Read Code obsolete terms and the lack of SNOMED combination rules. <sup>6</sup> ) Also, Britt observes a number of weaknesses in the structure and definition. <sup>3</sup> Specifically, the five level structure can lead to sub-optimal classifications, and consequential inconsistencies between users coding the same medical concept.
	<b>Level of abstraction</b>	Some codes are too specific, while others lack sufficient specificity.
<i>Pragmatic</i>	<b>Acceptance</b>	Read Codes are a UK standard, endorsed by the UK clinical professions in 1994, and used extensively within the UK. However, the Read Codes system does not have the same level of acceptance internationally and is provided only in English. Even in English speaking

countries, the terminology used in Read can be too specific to the UK.<sup>3</sup> The announcement of integration with SNOMED may alter this situation. Of particular significance is the announcement that "Read Codes (version 3) or its evolutionary successor, are to made a mandatory part of all NHS clinical systems at some time within the seven year implementation period of the new NHS Information Strategy" and the NHS Executive's view that "it was important that the Read Codes continue to develop to reflect the needs of the NHS and to ensure compatibility with developing international standards".<sup>7</sup>

<b>Availability</b>	Read is widely available, together with mapping and tool facilities, and is implemented by multiple vendors. Read Codes are updated quarterly, which ensures that the system can keep up to date.
<b>Compatibility</b>	Unknown

### 6.3 SNOMED

#### 6.3.1 Background

SNOMED (Systematized Nomenclature of Human and Veterinary Medicine) was introduced in September 1993, but has its roots in the early 1960s as SNOP (Systematized Nomenclature for Pathology). In April 1999 the Department of Health announced a joint initiative for the creation of a new clinical terminology. The College of American Pathologists and the NHS Executive have agreed to develop a new collaborative work, SNOMED Clinical Terms, which combines CAP's SNOMED RT with the Clinical Terms Version 3 (Read Codes). It is expected that the first version of this combined system will be available in December 2001.

#### 6.3.2 Description

Like Read Codes, SNOMED attempts to provide a comprehensive cover of the entire range of medical practice, but SNOMED is richer in its coverage of pathology, chemicals, and veterinary terms. Its main use is currently in pathology. SNOMED incorporates a coding system for concepts, with a rich set of modifiers, but not rules which constrain their use.

#### 6.3.3 Evaluation

**Table 6: SNOMED assessed against evaluation criteria**

<i>Syntactic</i>	<b>Complexity</b>	SNOMED is large in size, wide in its scope, and complex in its structure. This provides semantic richness, but can also make use over complex.
<i>Semantic</i>	<b>Scope</b>	SNOMED has its origins in pathology. "It works on a combination of pathophysiology, histopathology and anatomical site. It is a constructionist model which allows the development of highly specific codes which may be extremely useful in pathology". <sup>3</sup> However, Britt observes that it is too specific for primary care use, and that its constructionist basis allows

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construction of nonsensical concepts

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<b>Level of abstraction</b>	Spackman and Campbell suggest that the theoretical foundation for the compositional concept representation used in SNOMED RT provides a formal semantics for SNOMED assertions. <sup>8</sup> They argue that this provides a basis for understanding expressiveness and computational complexity, and a path for convergence with other systems, such as Read Codes. There is some experimental evidence that SNOMED-based queries provided better retrieval accuracy than equivalent ICPC-based queries, on a relational database. <sup>9</sup>
<i>Pragmatic</i> <b>Acceptance</b>	<p>The international community of pathologists has generally accepted SNOMED, but its use in primary and secondary care is limited. This has been attributed to its complexity of clinical concepts. These are co-ordinated within a multi-axial space. However, this is sometimes described as “conceptual spaghetti”!</p> <p>SNOMED’s weaknesses are its: excessive breadth, excessive granularity for primary care; lack of syntax for term combining, lack of validation within a primary care setting, and the fact that it was not originally developed with a primary care setting in mind.<sup>1</sup> Its strengths are its semantic richness (multi-axial and hierarchical, with both breadth and depth), its knowledge representation, the momentum in the USA and the fact that it is multilingual.</p>
<b>Availability</b>	SNOMED is widely available, and has been translated into many languages
<b>Compatibility</b>	The planned merge of SNOMED and Read Codes may produce an acceptable system. However, in the mean time, SNOMED and Read will exist as separate systems. Of the two, Read is currently more suitable for primary care purposes.

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## 7. CONCLUSIONS

### 7.1 Recommendations

We have been unable to identify a single “ideal” coding system for *NHS Direct*. However, the situation is developing rapidly, and the future development of Read/SNOMED will change the picture substantially. However, of the candidates considered, we believe the best current choice would be Read codes or ICPC. Both have the required scope for codifying *NHS Direct* consultations.

The advantage of the ICPC system is its international acceptance and its expressiveness for representing reasons for encounter. Further, it has the potential for a more specific nomenclature through mapping to other systems, such as ICD. Currently, we believe that ICPC-2 PLUS offers the best coding system for *NHS Direct*, given the above evaluation and the proviso that all current systems have disadvantages.

However, there is a strong pragmatic case for Read codes Version 3. Read codes have the

disadvantage of being a UK standard without international acceptance. The advantage of the Read code system is its use within the UK as a NHS standard. More significantly, the choice of Read codes for *NHS Direct* coding is implicit in the continuing commitment by the Department of Health and the NHS Executive to Read codes, or a future evolution; the anticipated imposition of Read Codes as a mandatory standard within the NHS for primary care; and the integration with SNOMED to create an international standard.

## **7.2 Further research**

Regardless of which coding system is selected for *NHS Direct*, the work in this paper does not constitute a validation. An empirical evaluation will be necessary, which examines how the coding system performs in practice in terms of the criteria set out at the start of this document.

## **8. ACKNOWLEDGEMENTS**

We are grateful for the advice and assistance of Ian Bowns.

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